INDUSTRIAL ARTS AND VOCATIONAL EDUCATION

IAVE

developing an auto mechanics course from the industrial arts point of view

(see page 42)

- On Effective I-A Teaching, Harrison
- A Progress Report on Vocational Education, Exton
- Designing for Metalwork, Lindbeck

January, 1960

MARCH SHOP ANNUAL

A Peek Over the Editor's Shoulder

March, 1960 means more . . . more areas of Industrial Arts previewed . . . more shop layouts, course outlines, checklists and material lists . . . more projects and an even greater perspective on the doings of Industrial Education nationally.

Here is a peek at what is coming your way in '60:

Tulsa's Junior High School I-A Facilities, Ruley

I-A Work in Waukegan's Daniel Webster Junior High School, McCall

Industrial Training of the Missoula County High School, Ullmer

The Des Moines Technical High School, Denny

The Long Beach, Calif., Industrial Education School, Thomas

The Central Missouri State College Applied Arts and Science Building, Grinstead

Ideas for Planning the General Shop, Hutchins

On the Issue of Shop Organization in Industrial Arts, Hammond

Role of the Consultant in Planning I-A Facilities, Dunton

What Would Constitute an Ideal Shop for Industrial Arts in High Schools?, Grayshon

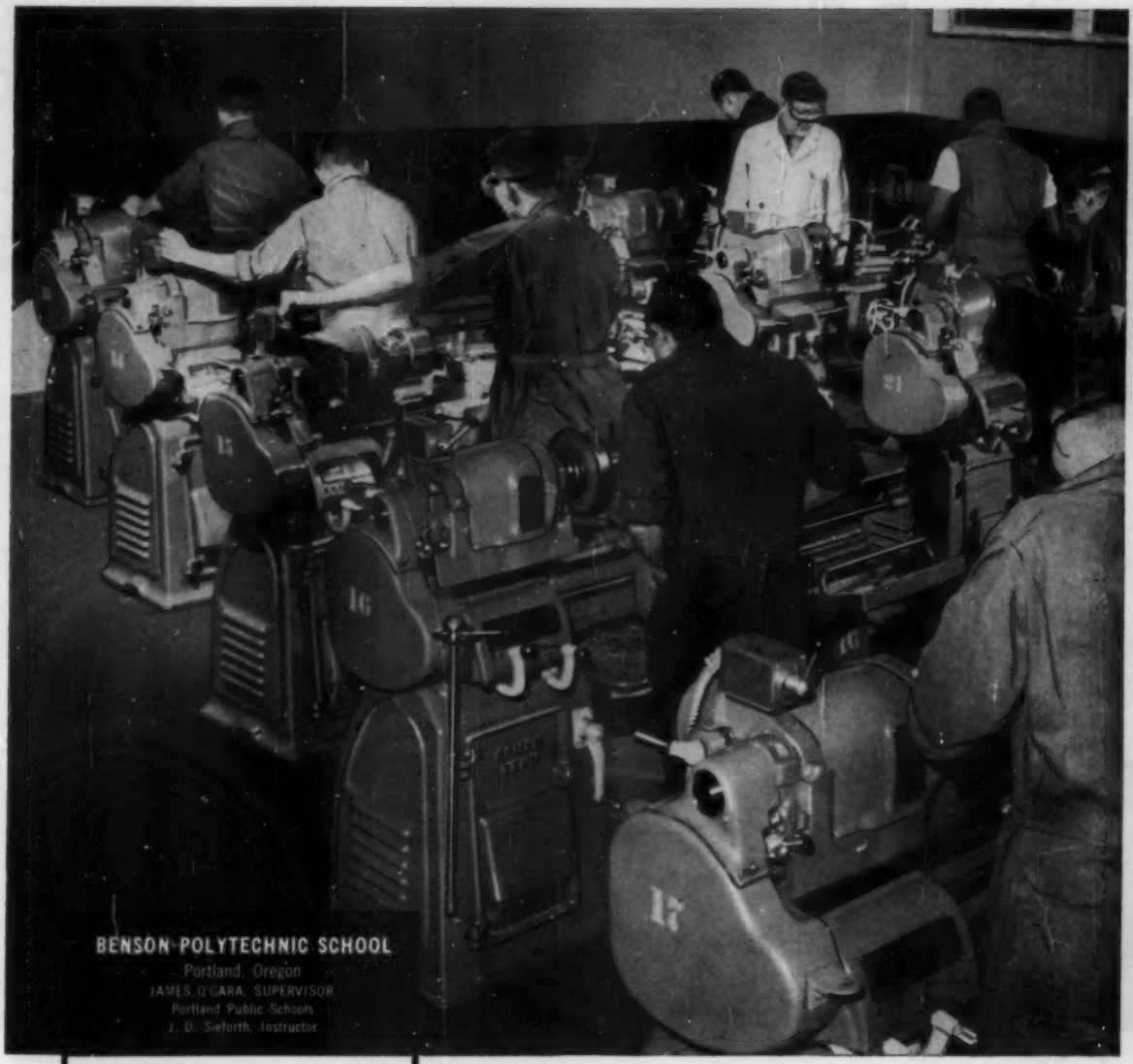
Why Not Lock Tool Cabinets?, Sonderman

A Color Code for the Finish Room, Farber

Suggested Checklist for the Electrical Shop, Miller and Cook

Frankly, we suggest **Industrial Arts and Vocational Education** in March . . . in 1960. Subscription prices are $4.00 (1 yr.) and $6.50 (2 yrs.).

Remember the March Shop Annual is not a special issue. It comes to you as a regular issue with your subscription to IA/VE. (Single copies: $1.00.)



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SPECIAL REPORT

How to Develop an Auto Mechanics Course, Trasin 42
From the industrial arts point of view, what should a course in auto mechanics include, how should this material be presented, etc.

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At the beginning of the year, a national evaluation of trends in vocational education

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On Effective I-A Teaching, Harrison 22
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Subscription Information. — Subscription price in the United States, U.S. possessions, and Canada, $4.00 a year; $6.50 two years; $8.75 three years; payable in advance. In all foreign countries, $5.00 a year. Single copies, 50 cents. March School Shop Annual, $1.00.

Discontinuance. — Notice of discontinuance of subscription must reach the publication office in Milwaukee, at least fifteen days before date of expiration. Notices of changes of address should invariably include the old as well as the new address. Complaints of non-receipt of subscribers' copies cannot be honored unless made within fifteen days after date of issue.

Editorial Contributions. — The Editor invites contributions bearing upon industrial arts, vocational education, and related subjects. Manuscripts, drawings, projects, news, etc., should be sent to the publication office in Milwaukee. Contributions are paid for upon publication. In all cases manuscripts should be accompanied by full return postage.

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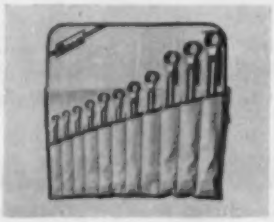

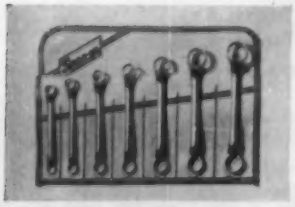

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---

Presenting what we hope are better articles for the profession, we will publish a series of six different features in the January through June issues of IA/VE. We want your reactions to these features. If you like them, we'll make them a permanent part of future issues. Next in the series, for your IA/VE for February, will be "What Does Research Say?"

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you guessed his line? Of course. He is one of the 15,000 highly skilled *tool designers* in the United States.

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5. He must possess the ability and personality to direct and supervise the work of other draftsmen and tool-and-die makers.
6. He must be able to work with all other company personnel, from the engineer to the production worker. It is his job to explain the use of the tools he has designed.

How to Be a Tool Designer

The best way to achieve this position is to enroll in a technical school after graduation from high school. Here you should specialize in drafting and/or tool engineering. In addition to these subjects you should take several mathematics courses including algebra, geometry, trigonometry, and slide rule. Science classes will also be an important part of your program. You will need to make a special study of strength of materials, machine design, and tool design. While you will not have to learn to operate all machines, you must acquire a thorough knowledge of machine shop. Only after two years of technical school training and a minimum of two years experience in a drafting room can you hope to become a *tool designer*. When you do, however, you will be one of the key technicians in industry.

How to Learn About Drafting Jobs

There are several ways. You might talk to a guidance counselor in your school. Better still, you could visit a large industrial plant and talk with one of the tool designers. You can read more about the requirements of the job by getting a copy of the 1959 edition of "Occupational Outlook Handbook" from your school or town librarian.

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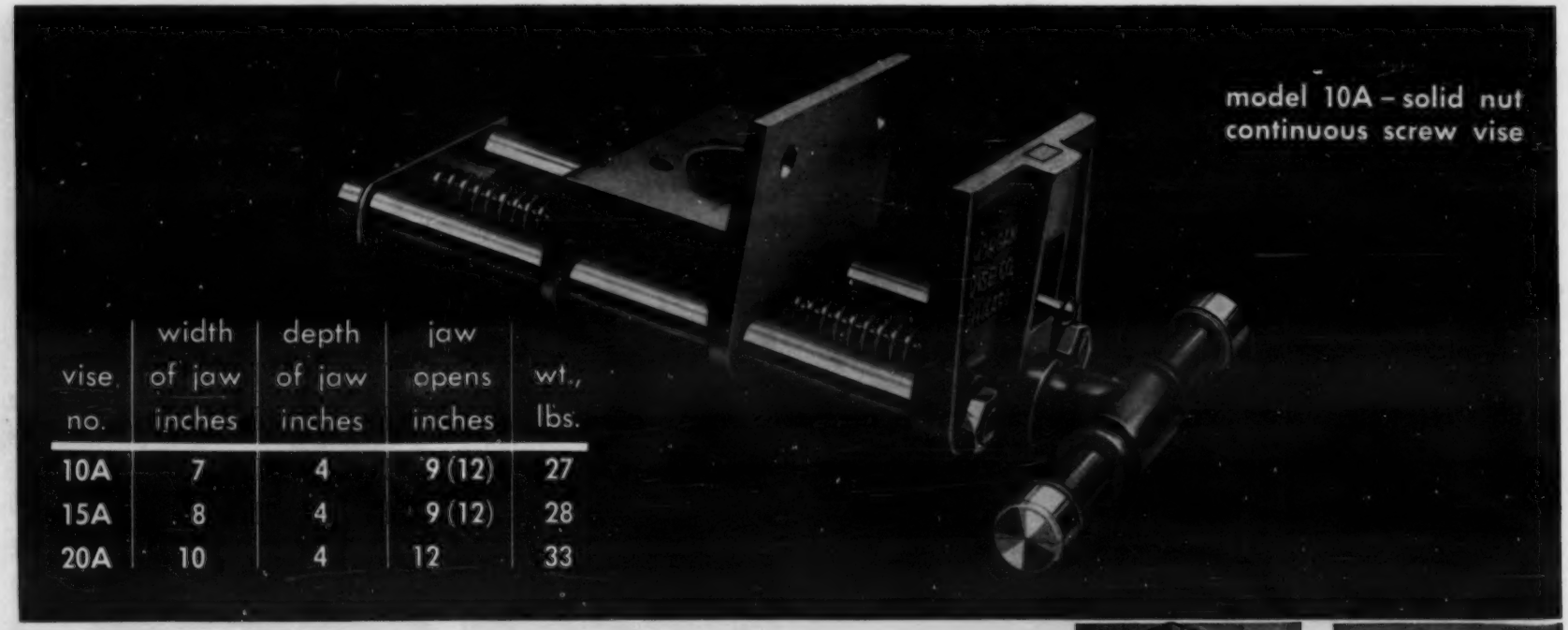

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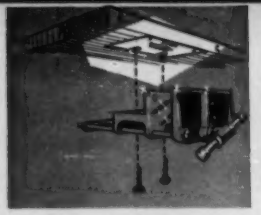

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on training welders

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(Concluded on page 50)

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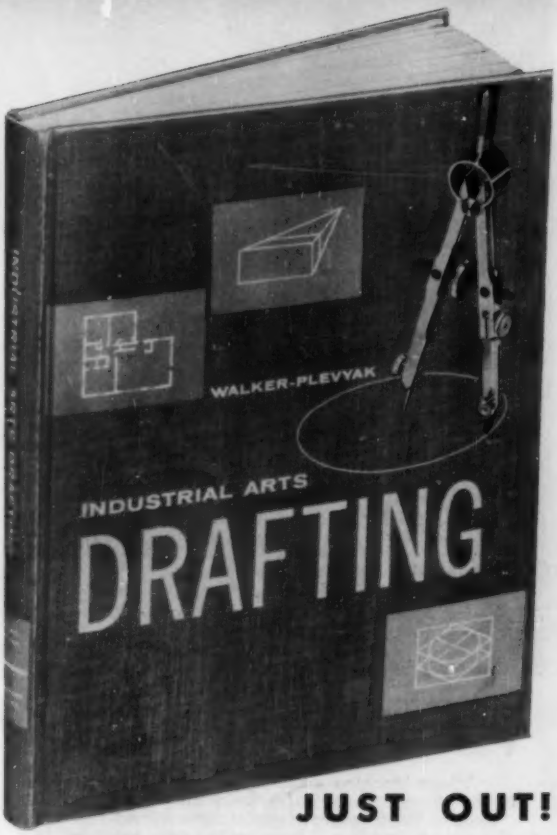

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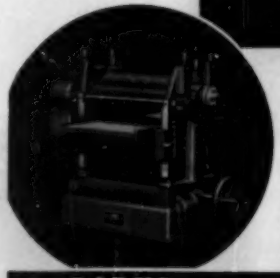

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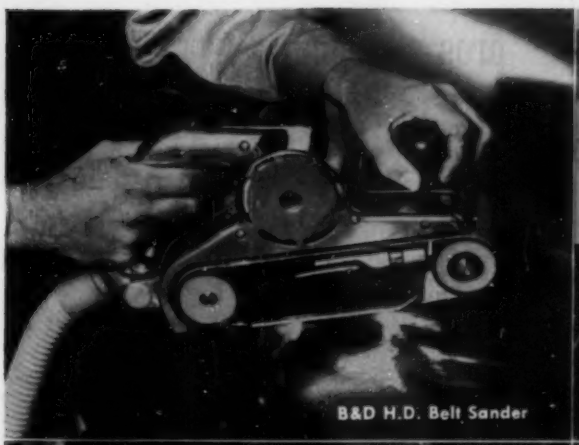
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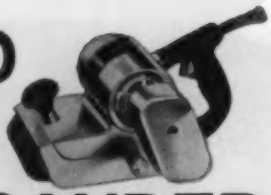

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on our "take-home" pay

▸ I like very much your editorial in the November, 1959, issue of IA/VE.

I would certainly agree very strongly with your thesis that we must convince Mom and Dad that Johnny is learning if we are to expect their support of the many valuable activities carried on in the public schools.

Thomas R. Bowman

Superintendent of Schools, Kalamazoo, Mich.

▸ I liked your editorial in the November issue very much. Your question is one which the teachers on-the-job and, perhaps more particularly, the colleges who prepare teachers, will have to face. I am not too pessimistic about the present situation and take my consolation in the pride and pleasure I had in visiting the exhibits of work set up by the Ford People in their award competition. I have seen in these exhibits the hope and the feeling that this is one of the real assets in our "take-home pay." Every year I have attended these exhibits and have been amazed at the number of people who come to see this work, and to be surprised and pleased when I hear adults say, "Well, I never knew that school boys could do such fine work!" All that any of our boys need is a few dedicated teachers alive to the present age with all its new problems, new skills, and technical knowledge which will be needed in these atomic-age days, together with an appreciation that quality work comes from hard work and know-how. I still think the solution of the problem-boy in our schools is "work," and perhaps this is best done under the guidance and experience of a good teacher in a public school.

James McKinney

Chairman, Board of Trustees, American School, Chicago, Ill.

▸ Your editorial in the November issue really hit home, since this is one of the items that I have been constantly discussing with our teachers. However, the teachers do have a point. If they require the students to work on a project until they develop the skills necessary to make that project as good as a store-bought item, they must of necessity spend more time in that area, and consequently have less time for exploring other experiences. Perhaps we should give some consideration to sending with a project some form of explanation to the parent that a proper evaluation of that project is not a comparison with a commercially made project, but rather a consideration of the knowledges and understandings and the preliminary experiences in basic skills that the students received in the process of experimenting in making the project.

After all, when John brings home an English composition for which he has received a satisfactory grade, his parents do not expect it to be of such a quality that it could be compared with published articles on the same subject.

I will proceed to get on an old horse of mine and proclaim once again that I believe that those of us in the field of industrial arts education must begin a planned campaign that will tell the story of industrial arts to lay people as well as to educational administrators. Perhaps we had better stop claiming as our goals a number of very broad and vague objectives which are difficult to evaluate and instead try to pinpoint some achievements which can more easily be attributed to and identified with a good industrial arts program.

William T. Kelly

Assistant Director, Division of Vocational and Secondary Industrial Arts, School District of Philadelphia, Pa.

a student syllabus

▸ I want to congratulate you on publishing the article "Student Syllabus" by Conrad Mayer in the November issue of IA/VE. It is a long time since I have seen in your magazine an article so pertinent, down to earth, and helpful to a shop teacher.

Every shop instructor can profit from the approach Mr. Mayer advocates. I am sure that such an approach would result in more efficient shop teaching as well as better student attitude.

Charles Quinlan, Jr.

Director of Industrial Education, Stratford, Conn.

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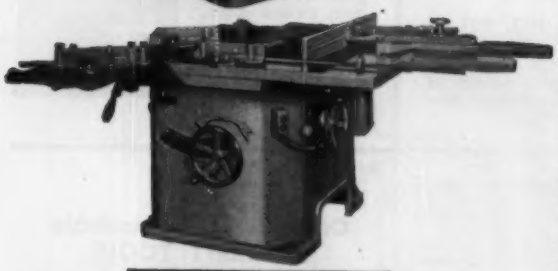

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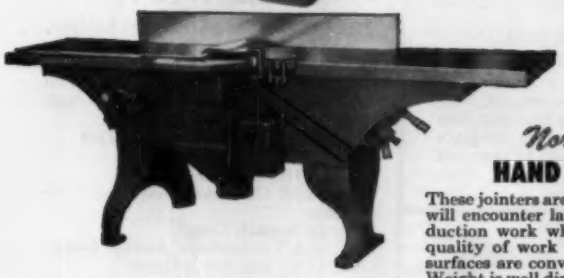

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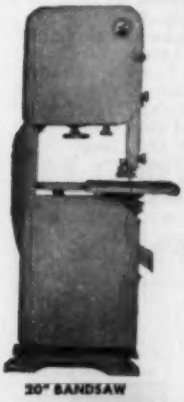

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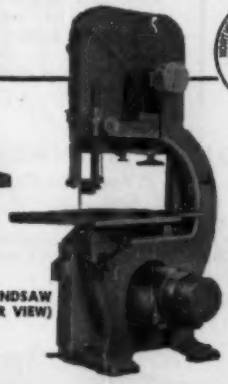

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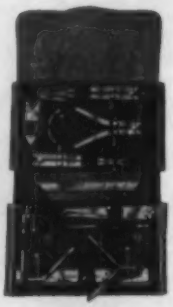

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the bulletin board / news notes and trends in industrial education

MITCHELL WARNS STUDENTS AGAINST DROPPING OUT

Secretary of Labor James P. Mitchell warned young people against dropping out of school. Boys and girls who drop out of school before getting their high school or vocational high school diplomas experience about three times as much unemployment as those who are graduated, he said.

Quoting statistics in a survey conducted by his department, Mr. Mitchell noted that, at present rates of pay, the expected lifetime earnings of persons with four or more years of college stands at a little over a quarter-million dollars; less than half that amount of total life income can be expected by those who graduate from high school.

"The temptation to quit high school for a job before graduation may be a strong one for many young people, but I think the advantage is temporary," he said. "Sincere preparation for a vocation with a good future pays dividends over a whole lifetime."

He added, "In our studies of the changing occupational patterns of America, one fact stands out. The years immediately ahead will show a significant increase in the educational requirements for good jobs."

PROJECT CURRICULUM LABORATORY

In an effort to integrate the learning activities of mathematics, science, and industrial arts students, seven industrial arts and science teachers served as technicians planning, designing, and constructing

What day last month did you turn in that plan sheet?

projects at a curriculum workshop during the 1959 summer session at the New York State University College of Education at Oswego. This fifth consecutive workshop was a co-operative effort of the State Education Department and Oswego College of Education.

Working with Mr. Abraham G. Beleson, of the Bronx High School of Science, the technicians prepared manuscript materials describing the techniques used and suggesting other creative activities that will challenge students. These

(Concluded on page 48)

ETV in industrial education

Every student has a close-up seat at closed-circuit television demonstrations at the University of Illinois' College of Engineering. In the view above, professor James L. Leach graphically presented the properties of molten metals before two television cameras to his class meeting in a room at the other end of the building. This use of ETV, that of magnifying detailed points for enlarged viewing by many students, is recognized as very valuable by ETV proponents and in this case illustrated the flow of metal at various temperatures and speeded up the presentation of metallurgical theory and foundry research.

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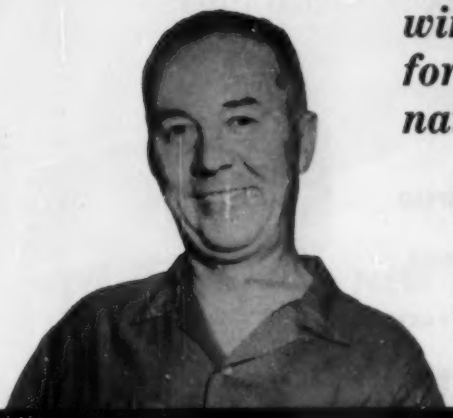
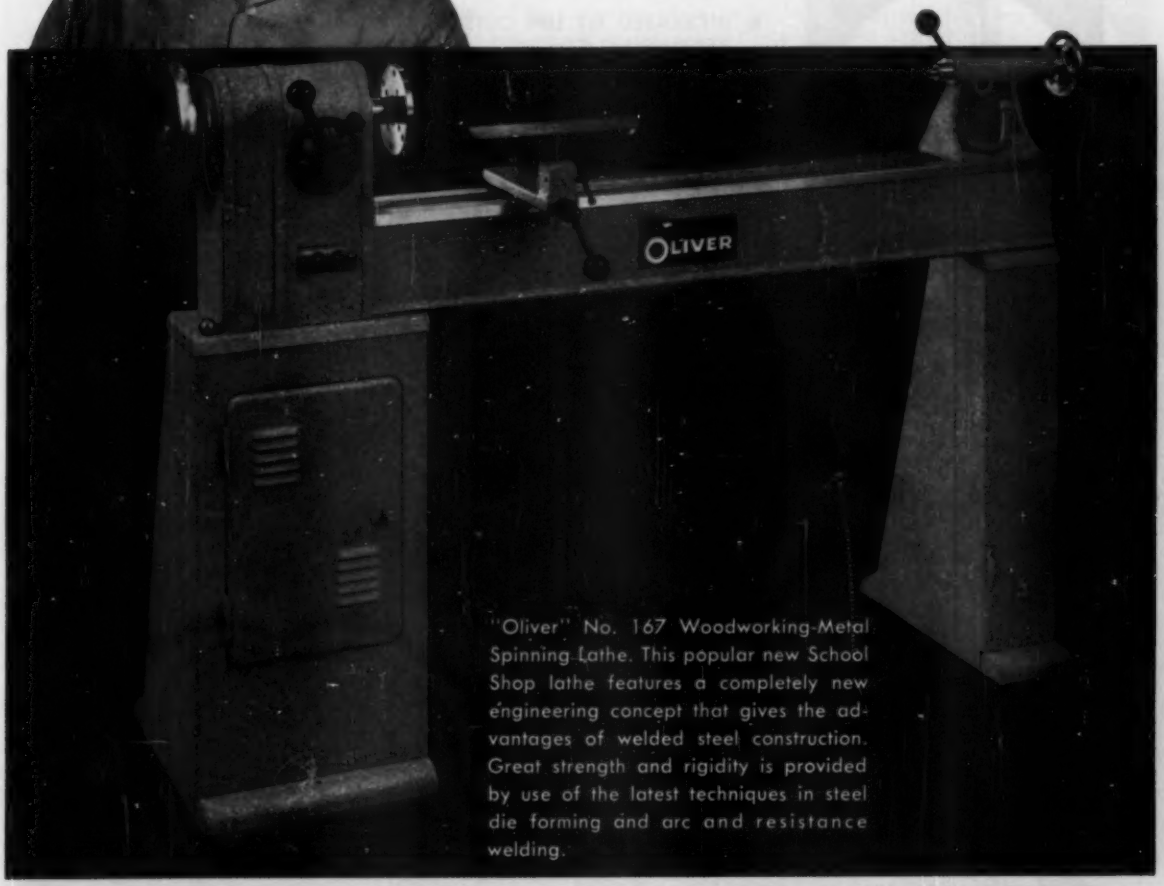


Ernst Duesing, Supervisor of sheet metal and steel fabrication operations for Oliver Machinery Company, is the proud winner of $10,000 first award in the 1959 Machine Design Award Program of the James F. Lincoln Arc Welding Foundation, Cleveland. Mr. Duesing's entry dealt with the design of the "Oliver" No. 167 Speed Lathe. Cited was the "ingenious adaptation of welded components in the lathe bed, headstock and other elements."



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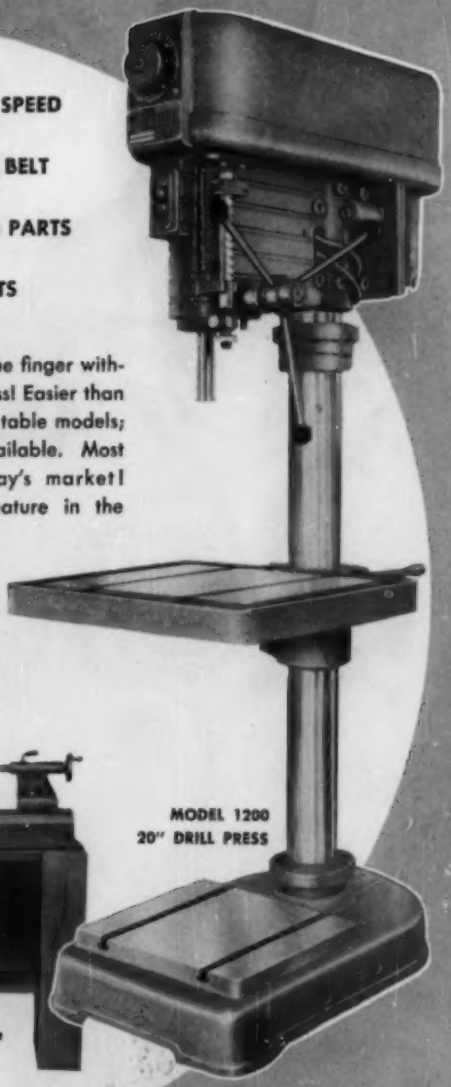

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OUR NEW YEAR'S RESOLUTIONS

This is the time of year for Christmas greetings and for best wishes for the new year. Many of our readers will be having a white Christmas and we hope that all of you are enjoying a well-deserved vacation.

Your editor is spending the Christmas vacation supervising an in-service program at the technical school at Hilo, Hawaii. This is the biggest island in the Hawaiian chain of islands. Its population is only about 30,000 and yet it has six times the land area of Oahu where Honolulu is located with its half million people. The big island is known for its pineapple, sugar, and cattle ranches. The Parker cattle ranch is the second largest in the world. A common sight are the cowboys, dressed very much like those in the old-time westerns. The only difference is that their faces reflect the many different backgrounds and cultures of Hawaii, Japan, China, Korea, and others. Some of the countries from which these cowboys' ancestors came have only recently felt the impact of industrial development. However, wherever you go, whether it's Hartford, Connecticut, or Hilo, Hawaii, there is need for good industrial education, and since this is the time of the year for making new year's resolutions, let's suggest some for industrial education.

For industrial arts **we resolve:**

1. To establish national standards as to what should be taught at each grade level. We need to establish specific objectives for each level of instruction. We need answers to such questions as what areas should be covered, how much training in skills, mathematics, and science should be included, how much time should be spent on design, planning, safety, vocabulary, and other subjects. To date, our content selection has been very indefinite and inconsistent. We can no longer enjoy the luxury of allowing each teacher to decide what is to be taught and how, when, and why. Why can't we in the profession agree to some minimum standards for content that will be accepted throughout the United States?
2. To establish minimum standards for plant facilities. Too often, industrial arts teachers are required to start teaching in new shops with nothing but four bare walls or with cast off equipment, benches, and tools. We should demand the same built-in facilities with which science, home economics, and art are provided when new school buildings are completed.
3. To require certain minimum technical preparation before a person can be certified to teach industrial arts. We should not continue to approve shop teachers who have little or no preparation. This is not the professional approach.
4. To require the use of basic instructional material and written assignments in every course. Our programs must include more than just "making something."
5. To develop standardized tests and other evaluating devices and to make them available to teachers everywhere.
6. To see to it that *all boys* have some experiences in industrial arts since we believe that industrial arts should be a basic part of the education of all American boys.
7. To promote research to discover how we can best achieve the above objectives. We need to continue studies of our modern technology in order to select the best content and the most effective teaching methods.

For vocational and technical education **we resolve:**

1. To discover the specific needs of industry in each of the technical and trade occupations for the next decade.
2. To define more completely the work of the technician in industry.
3. To establish new training programs that will meet the needs of our industrial democracy.
4. To develop standardized training programs for each trade and occupation including course outlines and instructional materials. These standards will assure our sending out our graduates with similar backgrounds. These standards, of course, should be reviewed frequently in order to avoid educational obsolescence in our training programs.
5. To do a better job of vocational guidance and counseling so that we can more carefully select students for each trade or occupation on the basis of their general and specific aptitudes.
6. To establish standardized tests, both written and performance. This will give us greater assurance that our technical school graduates are able to meet certain standards of proficiency.
7. To improve the placement and follow-up services of our vocational and technical schools.
8. To promote new technical programs so that the youth in all parts of our nation will have equal opportunity for vocational and technical education.

All too often New Year's resolutions are like the first snow of winter — gone and forgotten very soon. Let us hope that this is not true for industrial education.

John L. Feirer

Dear Friends: May I take this opportunity to express my sincere thanks to the many people who have written concerning my appointment as editor of IA/VE. I am sorry that I have not been able to answer each of your letters personally.

We hope that you will all continue to express the keen interest you have shown in each issue of the magazine and that you will also find time to contribute to your professional journal. Our success will depend on your help.

— *J. L. F.*

▶ specially fitting at the beginning of the year, a broad re-evaluation on the national level —

a progress report on Vocational Education

ELAINE EXTON

— Harry Goldstein

Vocational education is growing in stature. Not only have the older federally-aided programs — vocational agriculture, home economics, trades and industry, and distributive occupations — demonstrated their vitality by steadily gaining in enrollments, but in the past three years funds have been authorized to provide extended training for practical nursing (1956) and to establish programs for the fishery trades (1956), and skilled technicians (1958).

Class enrollments in all these fields will reach new heights in 1959 according to preliminary figures which foretell a peak exceeding last year's total of 3,629,339 students.

The extension of these educational opportunities has been accompanied by a corresponding increase in the amount of public money — federal, state, and local — spent for vocational education.

State expenditures for this purpose have risen almost steadily since the inception of the Smith-Hughes program in 1918 when they totaled $2,206,634 and the federal share was $832,427, or $2.65 of state money for every federal dollar. By fiscal 1958, the latest year for which this information is obtainable, the states' participation ($171,014,910) had increased to $4.42 of every dollar furnished by the Federal Government ($38,777,172).

A record $47,840,414 appropriation has been approved by Congress for vocational education for the 1960 fiscal year. This includes an increase over fiscal 1959 of slightly more than $3 million for the Title VIII area vocational education programs of the National Defense Education Act. The total is slightly more than an 85 per cent increase above the 1953 federal outlay of $25,811,591.

Congressional Interest

This demonstration of Congressional support is particularly significant in view of the fact that President Eisenhower in 1958 spurred on by a Joint Federal-State Action Committee Report proposed turning complete financial responsibility for the older vocational education programs over to the states beginning in 1960.

This year's Budget Message tersely states: "it is anticipated that no funds will be required in the 1961 budget for these programs, should the Congress accept as practical the recommendations of the Joint Federal-State Action Committee that the

Miss Exton is Washington correspondent for **The American School Board Journal.**

states assume this function entirely."

Actually this suggestion seems to be losing ground on several fronts. Successor bills to H.R. 12,524 of the 85th Congress whose purpose was to repeal existing federal vocational education laws so as to accomplish the proposed transfer were not re-introduced during the first session of the 86th Congress.

The present Congress, moreover, adopted legislation (Public Law 86–75) which repeals the federal tax on local telephone service whose partial relinquishment to the states to provide increased revenue in lieu of federal grants-in-aid for vocational education (but not earmarked for this purpose) was a feature of the Joint Federal-State Action Committee's proposal.

The Area Education Program

In this banner year for vocational education the most noticeable strides have been in the Area Vocational Program authorized under Title VIII of the National Defense Education Act of 1958 which President Eisenhower signed into law on September 2 of last year.

Forty-eight states, the District of Columbia, and Puerto Rico are now participating in this activity. To date $10,750,000 has been appropriated to the states for Title VIII including a starter appropriation of $3,750,000 for the fiscal year ending June 30, 1959. The first payment of funds to states has already been made for the fiscal year 1960.

One explanation of the quick response of the states to this activity is that the area vocational education concept is not entirely new. Since the passage of the Smith-Hughes Act of 1917 the area approach has taken root in one form or another in several states.

For example, in Connecticut state-operated schools have been in existence for many years. County or area vocational schools have prospered in Kentucky, Louisiana, New Jersey, North Carolina, Alabama, and Georgia. Other states that have established area vocational schools largely for youth beyond high school age include New York with its technical institutes and California with its program of two-year vocational-technical junior colleges.

Recognizing that Title VIII of the National Defense Education Act is only a small segment of the total area vocational education concept, many vocational educators believe it can provide a stimulus that will lead to the spread of the area pattern to other educational fields and services.

They consider this would be a desirable outcome because "area school programs at the high school, post high school, and adult extension levels are generally more flexible as a result of having a broader administrative base and therefore can reach more students, offer a wider range of courses, and meet unusual requests for specific short units of instruction with greater ease than would be possible in most school district situations."

Pointing out that effective planning will eventually embrace the growing need for vocational-technical education in many occupational fields, including agriculture, distribution home economics, and others not now provided for in the National Defense Education Act, vocational education leaders are citing such trends of significance for developing vocational-technical education on an area basis as these:

1. A trend toward more vocational education for groups beyond high school age in various fields.
2. A greater expansion of enrollments and services for adults in evening and extension classes.
3. Increased area programs in certain phases of vocational business education to improve instruction in such subjects as office practice, machine operation, and secretarial work.
4. Expansion of vocational guidance and counseling services due to the need for more careful student selection.
5. Extension of training programs to meet regional and national as well as local employment needs.

Legal Restrictions

While on the one hand the stress on area vocational education programs in Title VIII is encouraging consideration of the application of this concept to broader fields, on the other hand the restrictive language of the law limiting the use of federal funds to training of "highly skilled technicians . . . in occupations . . . necessary for the national defense" is causing criticism.

As interpreted by the Department of Health, Education, and Welfare Section 303 (a) (3) of Public Law 85-864 defines the basic intent of Title VIII and takes precedence over all else in this Title.

This provision of Section 303 (known as the Bush Amendment) reads:

a) Any amount paid to a State from its allotment under section 302 for any fiscal year shall be paid on condition:

3) that funds appropriated under Section 301 of this title shall be used exclusively for the training of individuals designed to fit them for useful employment as highly skilled technicians in recognized occupations requiring scientific knowledge, as determined by the State Board for such State, in fields necessary for the national defense.

The Technician Controversy

When the Defense Education Act was put in operation, it seemed apparent to some that its definition of an area vocational education program (Section 307) as one "designed to fit individuals for useful employment as technicians or skilled workers in recognized occupations requiring scientific or technical knowledge" was in conflict with Section 303 cited above.

Since no common definition for the word "technician" appeared to exist among labor, industry and management groups, there was a need for clarification. Mounting dissatisfaction over the scope of Title VIII resulted in the formation of a committee by a group of ten national organizations[1] — representing both labor and management — to work on regulations governing the area vocational education program and related matters.

Upon their invitation they were joined by representatives of the American Vocational Association.

Their patient discussions over an eight-month period and in a number of joint meetings with top Office of Education officials have borne fruit in the revisions of the Regulations (Misc. 3560) and the suggestions for their implementation (Misc. 3561) recently issued by the U. S. Office of Education. The modified regulations will be printed in the *Federal Register* where publication will give them the effect of federal law.

Office of Education officials emphasize that these revisions are intended to help clarify the basic intent and limitations of Title VIII as defined in Section 303 (a) (3). They say the adopted changes make it clear that (1) journeymen are not excluded from the training programs operated under this Title but may receive supplemental instruction that will enable them to advance to highly skilled technical jobs, and (2) apprentices may be enrolled in related courses that are technical in nature.

Broadening the Law

Encouraged by their victory in this skirmish the co-operating group of labor, management, and vocational organizations is laying plans to seek a revision in the National Defense Education Act itself, when the climate is right, which would broaden the restrictive language in Title VIII

[1] *Organized Labor:* AFL–CIO Trades Department; United Association of Journeymen and Apprentices of Plumbing and Pipefitting Industry; International Brotherhood of Electrical Workers; International Association of Machinists; Brotherhood of Boiler Makers, Iron Ship Builders, Blacksmiths, Forgers and Helpers. *Management and Industry:* National Association of Plumbing Contractors; Associated General Contractors of America, Inc.; National Electrical Contractors Association, Inc.; National Joint Apprenticeship and Training Committee for the Electrical Industry; Mechanical Contractors Association of America.

(Concluded on page 51)

Vitalize I-A Teaching with Research Reports

JOSEPH DUFFY

- With more and more effort being directed toward individualized instruction, the possibilities of **pupil and committee research** and reporting should be explored.
- Here is a report on one program in which a **variety of methods were utilized.**

Much has been said about the values of pupil or committee research. Evidence is seen in the use that students make of the data collected, the conclusions they draw from them, and the gain which they acquire from certain types of experiences using varied media of expression.

A trip to the industrial arts laboratory at Russell Sage Junior High School, Queens, N. Y. will demonstrate what happened when variety was put into term research reporting.

In this instance, term reports took the form of dioramas, models, specimens, photojournals, drawings, and paintings, as well as oral and written presentations. We have a situation in which to observe two things: the effectiveness and merit of these reports; the values to be gained as a result of this research, planning and construction.

Incidence of the Problem

Most teachers require some type of research project as partial fulfillment of a student's term work. This project should challenge the individual or committee to the fullest extent. It should reflect thought, imagination, resourcefulness, academic skills, and if possible, motor skills. The more educational objectives the project satisfies, the richer will be the learning experience.

In the past the author accepted written and oral reports because they required the students to do simple research, develop library skills, and compile data. However, he found that the majority of term reports expressed little thought, imagination, and creativeness. When orally presented to the class they were sometimes dull; when they were written very few students ever bothered to read them. The researcher was the only one made richer by the experience; others did not reap any benefit. It did not seem to be a worthwhile use of time.

To find a solution, the author suggested making a report using hobby interests. A suggestion was also offered that the topic chosen should involve other subject areas, such as science, social studies, mathematics, and English. The responsibility of the researchers was to report their findings in as interesting a manner as possible. In other words, to sell their data as commercial advertising sells merchandise. The research project no longer was just a compilation of data but a major problem of selling with all its ramifications.

For instance, there was an opportunity for co-operative effort on the part of the academically gifted and the craftsmen; students exercised imagination in the use of old and new materials as hobby and leisure-time interests were brought into play.

Models

One of the first problems attempted was the history and development of the hammer and saw. The committee promptly went to the library to do the necessary research and returned to the industrial arts laboratory to plan the models they were to make. Certain materials, such as stones, flint, slate, twigs, branches, and heavy twine were brought into the shop. Finally the committee busied itself with the making of primitive hammers and saws. The results obtained from this type of work were gratifying; the committee report was understood and the models were appreciated by others. In addition, they provided a teaching aid that could be used by others. The social studies and science teachers used the models to help illustrate the story of man's evolution. The models were put on display in the school show case. The enthusiasm of the students for this type of project mounted because they realized that they could actually use these models for and by the students and teachers of the school. Many projects of a similar nature were constructed. Models were employed to help illustrate the evolution of furniture, bridges, boats and water craft, medieval weapons of war, the principles of house construction, and the correct use of tools.

Dioramas

Some researchers chose to display their miniature models in a realistic setting, the diorama. The committee members gathered the necessary data, and under the leadership of competent chairmen planned their work. Responsibilities were assigned commensurate with the abilities and talents of the members. Some students sketched how the dioramas were to look based on the data collected. Others built the necessary frames and shells; those skilled in hand work began to construct the main configurations out of balsa wood, soap, beeswax, clay, lichen, steel wool, plaster of Paris, and any other material to which they had access and which they believed could be used to satisfy a particular need. Those not so skilled were given responsibilities not so exacting, such as making trees, collecting the necessary raw materials, and so forth. The committee artists painted the back and foregrounds, and when they ran into difficulty they sought aid in related art literature or from the art department. When all parts were completed the committee members participated in assembling the dioramas with care.

These pupil-made instructional aids

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have no equal in creating interest and understanding.

Photo-Journalism

Budding photographers of the class chose to make their research a photographic one. In one instance two students shared a paper route. They noticed a house was being constructed within their delivery area. They put film in their cameras and began to take pictures every afternoon, at about the same time, of the house as it was being constructed. They apprised the foreman of their desire to make a photoreport. They got a daily brief descriptive report from him of the construction that had taken place since the last picture was taken. The resulting report was informative. It was a graphic study of the construction of a house. No doubt the students gained from this experience.

Other students took their cameras into the museums and photographed their reports using the data and exhibits displayed to illustrate their research. How the American Indian used wood, the evolution of a tree, preserving our natural resource, the forest, are some of the topics reported in this way. Some students took pictures of various trees, bark textures, leaves, and so on to describe and identify trees as part of their report. Some took their cameras into cabinet maker's shops, and lumber mills and yards to help describe and define cabinet making, industrial techniques, and mass production methods.

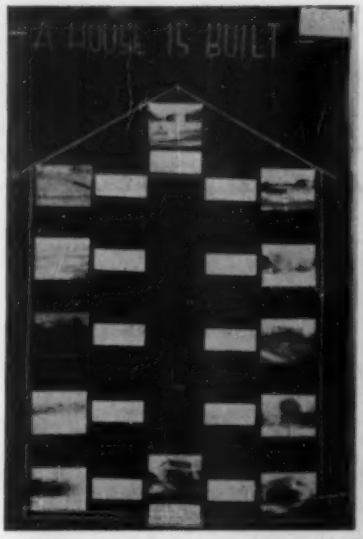
Specimens

Most educators agree that a firsthand experience is better than a contrived experience. Specimens supply the student excellent instructional material, assist the student to assimilate the material to be learned, because it is taught through the senses. Educators refer to this learning as perceptual learning. The student "junk collectors" who prefer to call themselves horticulturists, archeologists, ichthyologists, and so forth, collected a wide variety of specimens to help illustrate their reports. Tree samples cut, sanded, and shellacked with an accompanying research were handed in by several students. Cabinet woods were collected from various lumber yards, mills and job shops, and submitted with data on their physical characteristics and uses. Leaves and seeds were submitted as part of a report on classification of lumber. Nails, wood screws, forest insects, etc., were some of the specimens submitted as partial fulfillment of a term's research project.

Summary

These research projects required much more than just reporting the data gathered. They challenged the students to use hobby interests to create and present the newly found information in an interesting manner.

The author believes that the total time, effort, and materials required to make one of these reports is slight compared to benefits that accrue. ◀

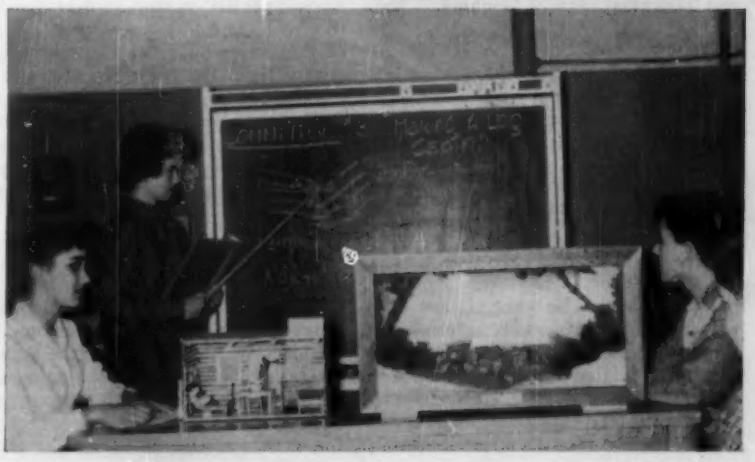


Below:
Pupil-made models help illustrate how tools are used.

Above:
Photo-journalism provides a graphic study of how a house is built.

Right:
A collection of specimens with research data conveys perceptual learning.

Below:
A committee report employs pupil-made dioramas, models, and blackboard illustrations.



On Effective I-A Teaching

OVAL S. HARRISON

▶ Among your new year's resolutions might be one to **reanalyze your teaching techniques.**

▶ This **capsule review** checklists the most effective teaching methods in industrial arts and provides a wealth of hints on how to best use each one.

There are many ways or methods of teaching and learning. Certainly no one of them is best for all situations. This is true no matter what the subject may be. The desirable way of teaching one industrial arts class may not be best for another class.

The successful teacher will not only rely upon one or a few methods to obtain the desired results but will use every plan at his disposal. The following methods have been used frequently in industrial arts teaching. It will be noted that, in most cases, they are a combination of both the group and individual plan of teaching.

Lecture Method

The lecture method of teaching is frequently used in the social sciences, English, etc. It is valuable where it is mainly a matter of imparting information or ideas from the teacher to his class. Where the entire group has a need for the same kind of information at the same time, the lecture method has great value.

The teacher, using the lecture method, should be careful not to wander off the subject. Wandering is quite a different thing from the discussion of related material and information. This related material should be a very vital part of the lecture and the entire class should take part in the discussion.

There should be a place in all lectures for the teacher to ask questions in order to determine whether or not he is being followed. If the class is large, the teacher should always stand because in this way he is in a better position to view the entire class and he can have a better over-all view of the reception of his lecture by the pupils.

At the beginning of the lecture it is usually well for the teacher to review quickly what was covered in the previous assignment. This is done in order to allow for continuity in the work from day to day. It is also well to give about five minutes at the close of the period in order to present in outline form the points covered during the lecture.

The chief weakness to the lecture method is that the instructor talks to the average of the class: the slow are ignored and the better pupils are not challenged.

The Demonstration

The demonstration method is very effective in industrial arts teaching. It is used primarily for showing how a certain type of work should be done. There is much work and planning in performing a successful demonstration. It makes no difference whether the demonstration is to be given to a small group or to the entire class; the following points should be given careful consideration before, during, and after the demonstration:

Is there a need for the demonstration? Thought should be given to whether the things to be learned may not be learned easier through some other method. Be sure the class is ready for the demonstration and has a need for it or it will be merely a show or performance put on by the teacher.

Are the aims clear and definite? The pupils should know what they are to gain from the demonstration. If the pupils know just why the demonstration is being held and how it can help them in their own work then they are likely to be interested and pay close attention.

Is everything in readiness? The teacher should have gone over the demonstration step by step. Even though the teacher has done the demonstration a number of times before, he should check and re-check every item. The pupils are quick to note the inefficiency of a teacher during a demonstration. No demonstration is effective if the teacher has to stop and send for another tool or piece of equipment.

Is the demonstration short? Short demonstrations are easier understood and remembered for a longer period of time than lengthy demonstrations. If the processes are rather long then it probably will be best to divide them into a series of short demonstrations.

Can you do the demonstration with skill? If the teacher wishes to become embarrassed then all he has to do is start a demonstration that he is not able to perform. Not only will his effectiveness be lost in that one demonstration, but also it will hinder his ability to perform future ones. His ability, in the minds of his pupils, has been decreased. He has failed in presenting the lesson.

Dr. Harrison is chairman of the Industrial Arts Department, University of Georgia at Athens.

- Delta

"The good teacher is a versatile teacher," adapting all the methods of the teaching-learning process to particular situations . . .

It is sometimes of advantage, at intervals during the term, to let pupils demonstrate before the class or before small groups of the class. In doing so be sure they can perform in such a way so that all can profit from the demonstration. Do not make the mistake of permitting only one or a few of the better pupils to give demonstrations but rather permit any pupil who is prepared and wishes to give a demonstration.

Panel Discussion

A panel discussion is a teaching technique and offers opportunity for learning not found in any other method. In it a small group of pupils engage in the solution of some problem before the rest of the class. This problem may be any of a controversial nature such as determining the best finish for cabinet woods. This small group, usually five or six, sit around a table and discuss various and all aspects of a particular problem.

In this technique of teaching all members of the panel should take part. Each member has a chance to present his viewpoint. Even though the other members are opposed to his ideas they are required to listen and consider what he has to say.

The entire class should have a voice in the selection of the problems for panel discussions. After a problem has been decided upon then the group is chosen and from this group they will select their leader.

Before presenting the panel to the entire class the group should do a great deal of reading on the subject and not only present their ideas but they also discuss what the experts have to say.

The leader should prepare questions to ask the group as the meeting progresses. The more intelligently and shrewdly he plans the questions, the more likely he will be able to stimulate the soundest thinking of his panel group. The leader should not talk too much but lead the discussion by asking questions and giving suggestions. He should get complete participation from his small group and not let one or two dominate the meeting. If the leader cannot reach a conclusion then he can submit the problem to a vote from the entire class.

Written Instruction Sheets

Written instruction sheets have been very successful in coping with the problem of individual differences. This is especially true if the class is large and the achievement is at various stages of development.

Written instructions, if properly prepared, are more brief and accurate than oral instructions. No written instructions should be used unless they are well written and serve a definite purpose. A poor instruction sheet is worse than none at all.

At first students do not like written instruction sheets. This is because they do not understand how to use them. With written instruction sheets most of the responsibility is placed upon the student. Learning is an individual responsibility and many pupils do not wish to accept it. The instruction sheets will tend to develop a feeling of responsibility and self-reliance on the part of the pupils.

Many teachers object to written instruction sheets by saying that some pupils cannot read accurately enough to profit from them. If this is true then the fault lies in the pupil's lack of reading ability and not from the instruction sheets. This same argument, if valid, would hold true of all textbook and printed material.

Written instruction sheets should be written in such a way that they will be simple enough for all to understand. Where unfamiliar words are used then their definition must be given directly on the sheet.

The instructor must be on his guard not to rely too heavily on the written instruction sheets. Handing out the sheets without adequate comment and discussion on how to use them is not good teaching. The teacher should encourage the pupils to get the information from the sheets, but when great difficulty is encountered he should give oral instructions to supplement the written instructions.

Problem Solving Method

The development of a pupil's capacity for reasoning, or problem solving, is one of the greatest accomplishments of education. The enhancing of this capacity depends upon the opportunities presented to the pupils. There are various terminologies used for problem solving such as creative thinking, reflective thinking, reasoning, and the pupil's discovery.

Creative thinking is of much greater importance than the learning of knowledges and skills. These knowledges, skills, and techniques are the instruments of learning which enable the pupils to do creative thinking.

Pupils must have freedom for choice of work in developing creative expression. The teacher is to help the pupil plan, but when a teacher solves the problems of the pupil he is taking from him the opportunity to learn and to solve his own problems. The teacher should guide and advise but not dominate the pupils in their choice of work projects.

If there is to be real and everlasting motivation the problems must be the pupil's problems and must be specific and definite. They must have a meaning. The pupils themselves must see a reason for the problems and a need for their solution.

The pupil must not be denied the opportunity to discover and present a problem, to think out in theory what he proposes to do, then to experiment and see if his ideas really work out in actual practice, and later to draw upon and evaluate what he has done. This is reflective thinking and is the highest type of thought process. It is through this process that discoveries are made and improvements are made.

The projects selected are of no great importance so long as they have meaning and there is a challenge to the pupil. They should be of such nature that they can be solved in the shop and not

beyond the ability of the pupil. These problems may be in designing, planning, and constructing a radio-phonograph combination, working out and developing plans for building a cabin, a pupil re-decorating his study room at home, or designing and building a modernistic end table. Problem solving in the elementary grades in industrial arts may be of a simple nature but still involving all the processes of critical thinking. It may be designing and building various types of birdhouses for different kinds of birds, planning and building child-size projects, planning a diorama or panorama, or planning, writing, and staging a simple dramatic production.

While some educators would go so far as to say that all industrial arts learning should be done on the problem-solving plan, believing that it is only through these things that pupils will develop initiative and originality, we must be realistic in our individualization of instruction. Some students will gain very little from this technique.

Certainly the problem solving method should be used to a very great extent in the industrial arts program. It is probable that industrial arts is better adapted to the problem solving method than any other area of school work. There is a definite place for it because all pupils should have an opportunity for exploration and experimentation and thus discover their abilities and real desires.

There are many problems which should be discovered and then solved by the pupils. However, when it comes to exact skills this is a different proposition. Problem solving must not be confused with the development of skills. In any type of work, where there is a right and a wrong way, the pupils should be shown the correct way and certainly discouraged when using the incorrect way. A skill is an exact habit of doing a thing, and it is easier to teach correct skills when incorrect ones do not have to be overcome. When working with dangerous machines there is no place for experimentation or any other form of problem solving. These machines must be used correctly, and in the accepted manner, or not at all. It is indeed a poor solution to a problem if the pupil should injure himself, or damage a piece of equipment, in trying to discover a solution to what he believed was a problem.

Textbooks and Reference Material

The wise teacher will require and use a text only to the extent that it aids in attaining the objectives of the course. Some industrial arts courses are not well organized because of the teacher's lack of experience or training. In this case a good textbook should be used because it will give the classwork a system of organization.

All good industrial arts teachers will have a great deal of reference material including shop plans, blueprints of projects, magazines, photographs, and articles dealing with the subject and of related material. These should be at the disposal of the pupils. A system should be used for checking out these books and materials in order that they will be used properly and not lost or damaged.

Audio-Visual Aids

Audio-visual materials are a common and everyday part of all instructional materials. Properly selected, illustrations in texts and magazines are a very effective means of visual presentation. The always present blackboard is often one of the most effective media for presenting shop and drawing problems. Any type of instructional material which uses the visual or auditory senses is known as audio-visual materials.

We are not getting too much value from audio-visual aids because of the many problems which must be met before their great value is realized. Some of the most pressing ones are (1) A large percentage of the present-day instructors do not know how to use visual aids. (2) Too many teachers look upon visual-auditory aids as mere forms of entertainment. (3) Some teachers believe in the fallacy that the more complex and expensive materials are best. They wish to use motion pictures and exclude others. (4) School buildings are not constructed for audio-visual materials.

How Should Projects Be Chosen?

If at all possible every industrial arts class should present the following three types of projects. *At least one in each group should be required for every pupil.*

I. *A Project Assigned by the Teacher.* Every shop teacher with experience knows that if the class is to learn and be able to do those things necessary for industrial-arts work that definite and exact projects should be assigned by the teacher. The pupils should have little or no choice in their selection.

These projects should be well presented with carefully worked out drawings and ways and means for doing the job. The pupils may or may not work from a complete job plan.

At its completion the project should be carefully appraised in terms of the pupil's ability. A close tolerance of measurement should be followed and it should be expected that each pupil be able to do all the processes necessary and to a high degree of accuracy.

II. *A Project Created by the Pupil.* The pupils should have the chance of working on some project of their own choosing. The teacher should aid in this choice only when and if he is needed. Let the pupils decide for themselves what concerns them and the problem should be of such nature that there is no ready-made solution. The pupils should design and plan their own projects by relying on their creative ability and the use of authority.

After the pupil has determined his own problem then he should get the teacher's approval before actual work begins.

III. *A Group Project.* One of the greatest assets in life is one's ability to get along and work with others. It is wonderful that this worthwhile trait can be developed and improved.

There should be group projects which call for group thinking, planning, designing, and working. It may be well that the groups be kept small or the project may be one calling for an entire class undertaking. It may be that the group will plan to produce a number of small projects by working on the mass-production plan.

After the industrial arts instructor has planned the problems and projects to be included in his course, he should consider what audio-visual aids will help toward attaining his aims. The next step will be to determine the exact aids to be used giving preference always to that type which is least expensive, easiest to use, and most readily available. Some of the more frequently used ones are: bulletin boards, posters, charts, maps, blueprints, photographs, completed projects, mock-ups, blackboards, motion pictures, models, exhibits, specimens, slides, and tools.

Field Trips

Class excursions and field trips are worthwhile if they are well planned, but just to take a class to see things has little educational value. The pupils should be informed in advance on the points of interest and things from which they can profit.

Upon the return from a trip a discussion should be held emphasizing the worthwhile points and explaining points the average pupil may have missed. Trips to factories, assembling plants, machine shops, wood mills, buildings under construction can be of tremendous education value if they are well carried out, otherwise the trips have very little real value.

In Summary

This discussion has attempted to discuss in a brief way the most common ways or methods of the teaching process. The good teacher is a versatile teacher. He adapts his techniques to changing conditions and situations. The hints presented here are intended to help the teacher review his technique toward improving them and using each one of them as effectively as possible.

▶ for power tools, a checklist of —

Safety Rules

JOHN T. BRUEHL, JR.
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A. Jig Saw

1. Insert blade ¼ in. in chuck.
2. Adjust tension.
3. Adjust hold-down.
4. Check; turn by hand.
5. Keep fingers from in front of blade.
6. Push slowly.
7. Hold wood down.
8. If it knocks, stop and check.
9. Use fingers to tighten.

B. Sander

1. Check belt.
2. Adjust belt.
3. Watch fingers.
4. Move work across abrasive.
5. Hold work on down side of disk.
6. Brush dust, don't blow it.

C. Wood Lathe

1. Center the wood.
2. Adjust speed.
3. Adjust tool rest to center of the work.
4. Wear no loose clothing.
5. Keep tools sharp.
6. Use tools properly.
7. Remove tool rest before sanding.

D. Drill Press

1. Lay out work, center punch.
2. Hold work firmly.
3. Insert bit properly.
4. Adjust speed.
5. Feed slowly, keep cutting chips.
6. Ease bit through.
7. Keep bits sharp.
8. Wear no loose clothing.

E. Grinder

1. Wear goggles or eye-shields.
2. Get permission.
3. Watch fingers.
4. Check tool rest.
5. Keep the work cool.
6. Use the correct grit.

F. Circular Saw

1. Get permission to use the saw.
2. Keep fingers away from the blade.
3. Stop saw to adjust.
4. Adjust blade ⅛ in. above wood.
5. Adjust ripping fence.
6. Adjust miter head.
7. Use push stick for narrow pieces.
8. Add 1 in. Safety Block for cutting off.
9. Hold stock firmly.
10. Stand out of the line of the saw blade.
11. Never remove small pieces while the saw blade is moving.
12. Keep saw sharp.
13. Use saw guard properly.

G. Jointer

1. Get permission.
2. Check fence.
3. Check depth.
4. Check knots.
5. Don't cut wood less than 6 in. long.
6. Use the mitten for thin pieces.
7. Use hook stick for narrow pieces.
8. Get help on the long pieces.
9. Stop the machine to adjust it.
10. Use the guard over the cutter.

H. Planer

1. Get permission.
2. Adjust when the board is not moving.
3. Plane one piece at a time.
4. Cut no more than ⅛ in. at a pass.
5. The thinnest board is ¼ in.
6. Shortest boards 12 in. long.
7. Watch loose knots.
8. Watch fingers.
9. If the board sticks, snatch it sideways.

I. Metal Lathe

1. Center the work.
2. Use the correct tool.
3. Set the tool at correct height.
4. Use correct speed.
5. Use correct feed.
6. Wear goggles.
7. Keep eyes on the machine.
8. Oil machine.
9. Shift gears slow.
10. Keep clutch out of gear when not using it.
11. Wear no loose clothing.

J. Power Hack Saw

1. Clamp work.
2. Support the work.
3. Ease the blade down to cut.
4. Watch moving parts.

K. Metal Shaper

1. Get permission.
2. Clamp the work firmly.
3. Adjust the height.
4. Adjust the stroke.
5. Adjust the cross feed.
6. Adjust the speed.
7. Watch your fingers.
8. Watch the chips.
9. Watch the moving parts.

L. Welder

1. Get permission.
2. Use the eye shields.
3. Wear gloves.
4. Wear goggles to chip the bead.
5. Ground the work firmly.
6. Select the correct electrode.
7. Select the correct amperage.
8. Keep the arc snapping.
9. Chip and brush the slag from the bead — wear goggles.
10. Check the bead.
11. Watch sparks.
12. Check for fire.
13. Touch nothing with your fingers.

How to use these rules effectively: give each pupil a copy, demonstrate each rule; test orally and in written form before allowing students to use each machine. Also letter the rules (in India ink with letters 1 in. tall) on a yellow panel (painted on each machine). Apply (by laying on, not scrubbing) several coats of white shellac.

DESIGN for the TEACHER

john r. lindbeck

Assistant Professor of Industrial Education, Western Michigan University, Kalamazoo, Mich.

▶ Most teachers agree the principles of **good design** should be a major part of their presentation, but are puzzled by the "how-to."

▶ Here is a series of articles on **design application** in various areas — the first of which is on metal.

Designing For Metalwork

A perplexing problem to teachers of bench metalwork and forgework is that of design application. How exactly is design related to this area of shopwork? How can students be taught the rudiments of forgework in terms of good design practices? What can be constructed besides the usual cold chisels, ice chippers, and tongs? These are questions which have crossed the minds of teachers of metalwork time and again.

The problem resolves itself as one in which the thinking should perhaps be directed toward the fullest exploitation of tools, materials, and processes according to a specific situation. For example, one might assign the task of designing a fireplace set. The instructor must now provide stimulus and direction for this activity through a discussion of the elements of the area which are at the disposal of the student. He must demonstrate processes, he must conduct an inquiry into the nature and limitation of the available materials, he must encourage experimentation by discussing new possibilities. These are the tools of action which lie at the root of creative activity, for all such activity must await the acquisition of knowledge.

Turn the Students Loose

Now let the student loose in the shop. Let him heat and pound and bend and cut and twist. Let him discover the many things he can do with and to these materials. And help him acquire some skill in handling this medium.

The result of all this is a student with the readiness to investigate independent design activities. Now introduce him to some of the basic design considerations, the things he should think about in planning this fireplace set. These can emerge as questions to ask about this product. What is it for? How is it used? What are some of the materials one can use in constructing it? How strong should it be? Do the processes learned suggest any unique possibilities? How is it usually made? Is there a better way? Was there anything seriously wrong with any you have seen or used? How can they be improved? How can it be made to not only work, but look well?

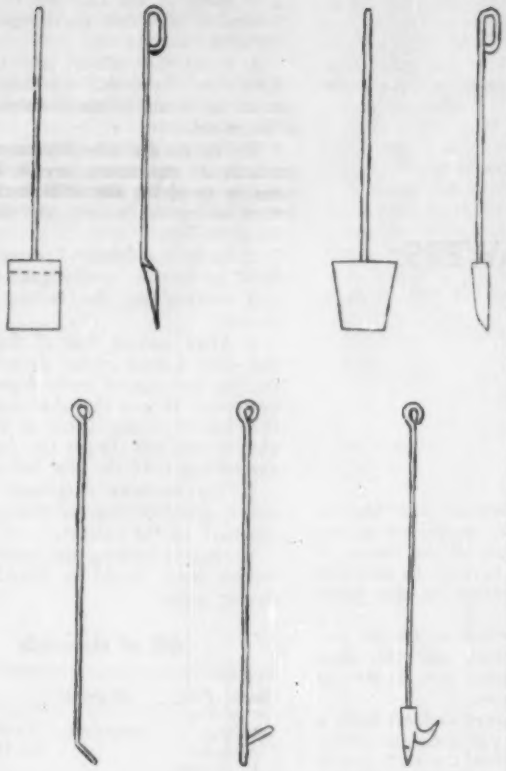
Through an inquiry such as this a student now achieves an awareness of the purpose of his task. Now invite him to measure and sketch and think and discuss and alter, until he is satisfied that he has come up with something good. Then let him further experiment with his ideas and make necessary changes in design. The final step is to construct the item.

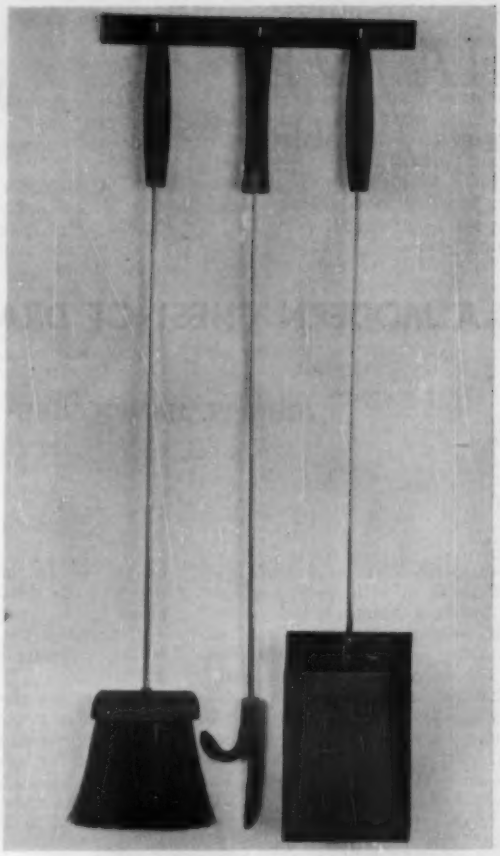
One Result of This Inquiry

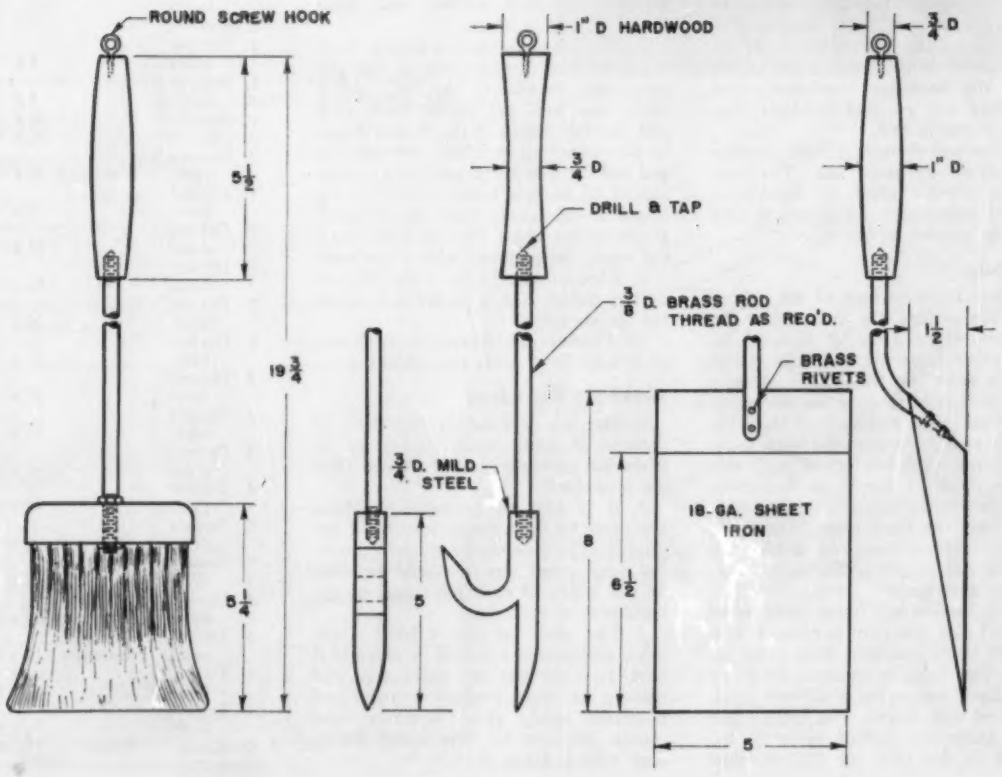
The accompanying photograph shows one result of such an experience. The poker was forged, the shovel was fabricated of sheet steel, and the broom is merely the replacement brush unit available at hardware stores. The stems are 3/8-in. brass rod and the birch handles were turned on a lathe. Brass eyes in the handles provide for hanging, and the hanger is hammered mild steel with brass hooks. A coat of flat black paint and lacquer add the finishing touches.

A possible answer to this perplexing problem might be this one approach. Perhaps by giving the student the necessary knowledge and motivation and direction, he can solve his own design problems. ◀

DESIGN SKETCHING—







IA/VE
projects / problems

A MODERN CHEST OF DRAWERS

JOHN W. HAMPTON
Dallas, Tex.

This attractive chest of drawers was designed to fit in with modern groupings of bedroom furniture, and yet retain the loveliness and sturdiness of craftsmanship found in solid wood furniture. The design combines the modern lines, features, and construction found in today's most exclusive and expensive furniture, yet its cost fits modern budgets.

Plans have already been printed for a modern bedside table (your IA/VE for October, pp. 234–235), bookcase headboard bed (November, pp. 272–273), and a dresser (December, pp. 302–303). This chest of drawers is similar in design and functional beauty. The rail separating the top drawer from the lower drawers is the same height as the top of the bookcase headboard, thus when they are grouped together they share a common line.

This chest of drawers is built of white oak, finished in limed oak. The construction of this chest of drawers is easy and inexpensive. Construction time should be around 60 hours.

Procedure

1. Choose the surface of the top to be the top surface. On each end of the undersurface cut a ¾ by ¾-in. dado, ¼ in. away from the end, and end it one inch from the front edge. Make a ⅛ by ¼-in. rabbet along the underside of the back edge, ending it at the dado on each end, to accept the dust back.

2. On the inside surface of each side cut the three ¼ by ¾-in. dadoes to accept the drawer dividers, ending each ¼ in. from the front edge. Make a ⅛ by ¼-in. rabbet along the inside rear edge the full length of the side to accept the dust back.

3. The bottom is a frame made up of four 1 by 3-in. pieces of hardwood, with a ⅛ in. thick masonite dust panel set into it. The frame measures 1 by 18 by 36 in. Each corner has a mitered joint, reinforced with dowels. The inside edges of the frame are dadoed ⅛ by ¼ in., for the ⅛ by 12½ by 30½-in. dust bottom to be inserted. The top of the masonite insert should be ¼ in. below the top surface of the frame.

4. Assemble the bottom. Be sure the bottom is square before the glue joints set.

5. After the glue has set on the bottom, repeat step one, only this time make the cuts on what is to be the top surface of the bottom.

6. All of the drawer dividers have a ⅛ by ¼-in. dado cut along the center of one edge to allow the dust panels to be inset.

7. The base is cut as shown. The joints are double mitered and reinforced with glue blocks.

8. The design on the top drawer front requires some careful work on the circular saw. Parallel to the ends, cut a ⅛-in. saw kerf ten inches from each end, the full height of the drawer front. In the spaces on each end, between the end and the saw kerfs, cut eight equally spaced ⅛-in. saw kerfs parallel to the length of the drawer front. Excess wood at the points where the saw kerfs meet can easily be removed with a backsaw.

9. Each of the ½ by 2 by 16½-in. drawer guides has a ¼ by 1-in. dado cut on one side.

10. Drawer construction is as shown, or it may be of your own choosing.

Assembly Procedure

1. The job of finishing the chest of drawers is made much simpler if all parts are carefully sanded before they are assembled.

2. It is best to assemble the base first. Due to the mitered joints and the slanted sides, glue blocks reinforced with flat head wood screws should be used on the inside of each joint and on the back ends of each side.

3. The shell of the cabinet (top, sides, and bottom) should be assembled next. Lay out the two sides, top, and bottom in their respective assembled positions, apply glue, assembly, and clamp. Be sure to wipe away excess glue with a damp cloth.

4. The drawer dividers and masonite dust panels may be installed while the glue joints on the shell are drying. Be sure all of the joints are clamped before the glue starts to set.

5. When the cabinet and the base have dried thoroughly the base is glued onto the frame of the bottom member of the cabinet.

6. The drawer assembly procedure is practically self-explanatory. Assembly is easiest by gluing the sides to the front, then adding the bottom, and gluing the back on last.

7. After the drawer has set, the ¾ by 1 by 16⅝-in. center guide is glued and screwed on the bottom of the drawer.

8. After making sure of the drawer fits, glue dadoed center drawer guides on the bottoms of each drawer compartment. Before the glue sets, insert the drawers, lining them up while the glue is still wet. Leave the drawers in the cabinet until the glue has set.

9. The masonite dust back may be nailed, glued, or attached with screws to the back of the cabinet.

10. Before starting the finishing procedure, holes should be drilled for the drawer pulls.

Bill of Materials

Quan.	*Part*	*Material*	*Size*
1	Top	White oak	1 x 18 x 36
2	Sides		¾ x 17 x 37½
1	Drawer front		¾ x 6 x 35½
3	Drawer fronts		¾ x 10 x 35½
1	Rail		1 x 1 x 35½
2	Bottom frames		1 x 3 x 36
2	Bottom frames		1 x 3 x 18
1	Base front		¾ x 4½ x 36
2	Base sides		¾ x 5 x 17¾
2	Drawer sides	White ash	½ x 6 x 17⅛
1	Drawer back		½ x 6 x 33⅛
2	Drawer sides		½ x 9⅝ x 17⅛
1	Drawer back		½ x 9⅝ x 33⅛
2	Drawer sides		½ x 9¼ x 17⅛
1	Drawer back		½ x 9¼ x 33⅛
2	Drawer sides		½ x 9⅜ x 17⅛
1	Drawer back		½ x 9⅜ x 33⅛
4	Drawer guides		¾ x 1 x 16⅝
4	Drawer guides		½ x 2 x 16½
6	Drawer dividers		¾ x 3 x 34½
6	Drawer dividers		¾ x 3 x 11
4	Drawer bottoms	Plywood	¼ x 16½ x 33⅛
3	Dust panels	Masonite	⅛ x 11½ x 29
1	Dust bottom		⅛ x 12½ x 30½
1	Dust back		⅛ x 34½ x 37½
9	Knobs	Brass	2¼ diameter

Finishing Procedure

The chest of drawers described has a limed oak finish, but it could have been finished many different ways. If you prefer a limed oak finish the following steps will assure you of a good finish.

1. Sand well all surfaces to be finished, ending with 6/0 sandpaper, making sure all scratches and chips are removed or feathered out.

2. Raise the grain at least two times to make sure all mars are removed.

3. Remove all sanding dust with an air hose and wipe the surfaces down with a clean dry soft cloth.

4. Apply as many coats of a good white wood filler as necessary or desired to fill the grain smoothly and evenly.

5. After the wood filler has dried thoroughly, sand all surfaces very lightly with very fine steel wool, and again clean surfaces with an air hose and a soft clean cloth.

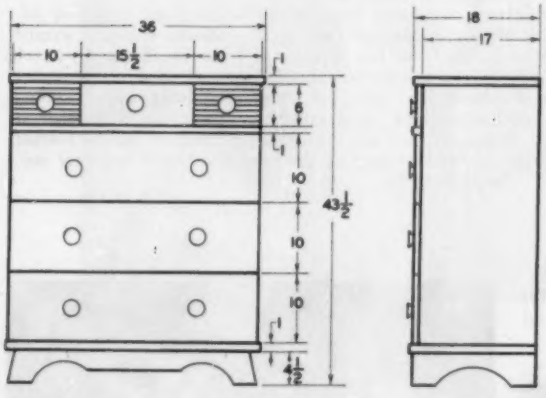
6. In order to be sure that the wood filler won't turn yellow, water white lacquer should be used for the finishing.

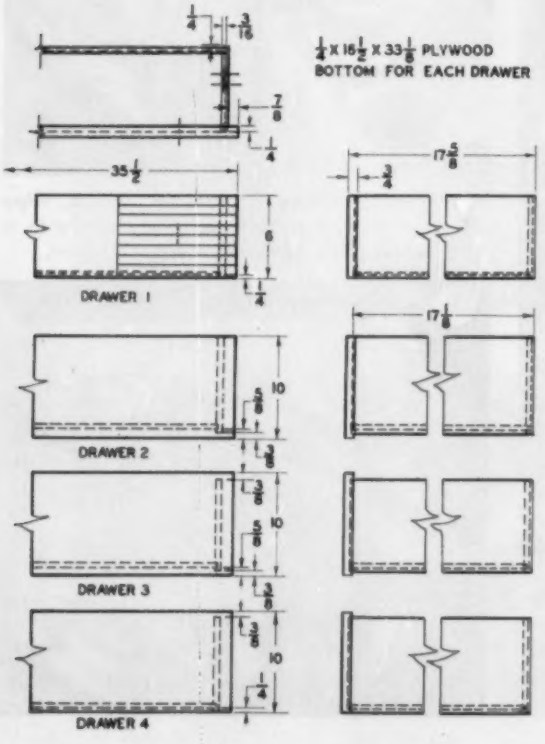
7. Apply two or more coats of water white sanding sealer lacquer, rubbing to a smooth finish between each coat with fine steel wool.

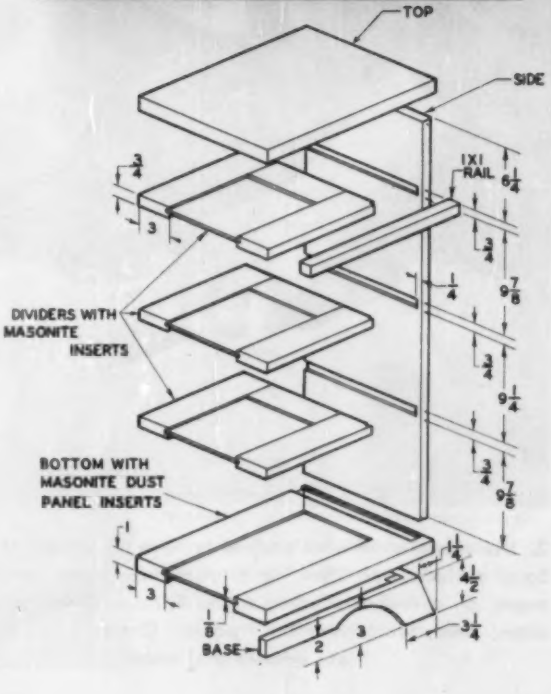
8. Before applying the finishing lacquer, be sure the final coat of sanding sealer lacquer has thoroughly dried, and has been rubbed to a glass smooth finish with steel wool.

9. Apply four or more coats of water white finishing lacquer. The thinner, and more coats applied, the better the finished surface will be. Between each or every other coat of finishing lacquer, the surfaces should again be rubbed down with very fine steel wool and cleaned.

10. After the final coat has been applied, rub down the surface again with very fine steel wool. Rub the surface briskly with clean soft toweling or cheese cloth. If you have been careful in the above steps a mirror like surface will be obtained.







▶ pictorial clip sheets for your display —

ON FURNITURE REFINISHING

N. M. PITTMAN
Instructor, Industrial Arts
Leverett's Chapel School District
Overton, Tex.

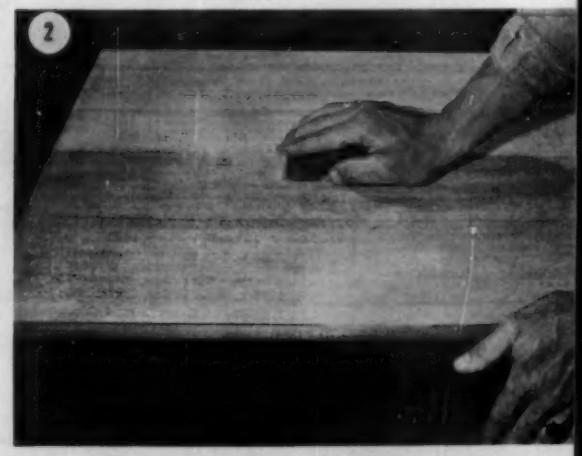
One of the projects often encountered in the school shop is the refinishing of furniture.

Contrary to general belief, this process is not a tedious job. With the use of the new "wet type" chemical solvents, varnish removers, etc., the job is reduced to a simple do-it-yourself operation. Eight steps are usually required to secure a professional looking job: stripping, sanding, staining, filling, sealing, topcoating, rubbing, final polishing. There are a number of safe, fool-proof, and deep penetrating removers on the market. Check with your dealer for the type and brand that best suits your needs.

1. Apply thickest possible coat of remover — without brushing out. Check to see that cutting is complete, then remove old finish with a round-edge putty knife.

2. Use coarse steel wool pads to remove remainder of sludge. Sand surface with "fine" grit, aluminum oxide (production) paper on a rubber sanding block. Sand with the grain; dust often; finish with "very fine" paper. Check to see all edges are smooth and clean.

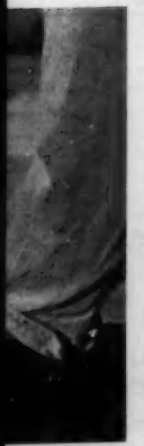
3. When the surface is perfectly smooth, wipe off all dust with a soft rag and stain with a brush or cloth. Remove excess and let dry.



7. After 24 hours of first coat drying, sand the surface lightly with "extra fine" silicon carbide, wet or dry finishing paper, used dry. As the eighth and final step, polish the finished surface.

6. Wipe the sealed and sanded surface free of dust and apply either clear rubbing varnish or clear brushing lacquer. Don't work in a dusty room; don't work in a cold area; don't stir high gloss varnish as hard-to-remove bubbles will result. Flow the varnish on with a full, quality brush and smooth out with the grain.

5. Spray or brush with a wood sealer. Follow with very light sanding to remove brush or spray marks. Sand the edges first, working toward the center and removing all "bright" spots.



4. When the stain is absolutely dry, apply paste filler to open-grained woods to fill the pores and provide a level base for the finish coatings. Apply across the grain using plenty of filler. Touch-up by lightly wiping with the grain. Let filler dry overnight.

PORTABLE CLEAN-UP RACK

KENT E. JOHNS and KENNETH CLICK
General Shop Instructors, Cadillac, Mich.
Junior High School

The expediency of clean-up time, which can be the most frustrating time of the class period, depends on how well you have your classes organized.

Common knowledge tells us that industrial education classes must be well organized to be effective. Assigning duties for everyone in class is a prerequisite for getting your classes cleaned up quickly and effectively.

For the majority of shop situations, the location of clean-up materials such as hand brooms, push brooms, dust pans, etc., is in a permanent position. But what if you have a two- or three-room shop and not enough brooms for all areas?

A solution is this portable clean-up rack which has proven to be a definite asset in getting the shop cleaned up in a shorter period of time.

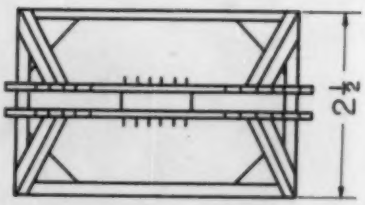
When one person is assigned the duty of bringing the rack to the area which is to be cleaned up, much "running around" by other members of the class is eliminated.

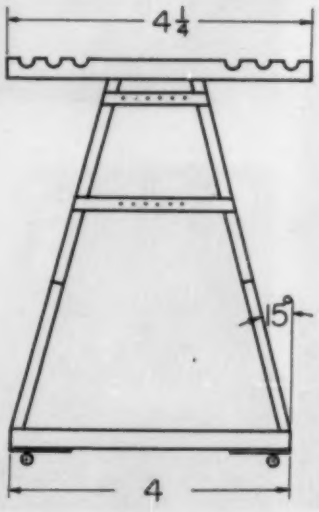
This rack was designed to handle 24 hand brooms and six push brooms but could be altered to handle more or less depending on the size of the class and the areas to be cleaned.

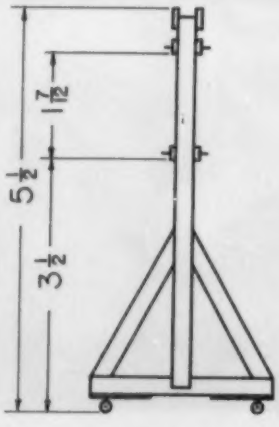
If your shop has several doors of varying widths, be sure that the width of the rack is less than that of the narrowest doorway.

Eight-penny finishing nails were used to hang the hand brooms but eye hooks or some other equally satisfactory hanging device may be adapted.

This clean-up rack also has a platform for holding a box or other suitable container for depositing the sweepings. The dust pans would also be carried on the platform.







MOSAICS IN THE WOODSHOP

DONALD F. KINNAMAN
Instructor of Woodwork
Camelback High School
Phoenix, Ariz.

Many years ago a technique in handcrafted art was perfected. It consisted of setting stones, small pieces of tile or glass into a definite pattern or design and the crevices filled with grout or cement. This art was named "mosaics." Many designs from the past are still with us in many museums; and the art has gained much popularity in recent years, especially in school art departments.

Because of the intricate work involved a finished mosaic is quite costly on the commercial market. Similarly those being produced at present in the schools have a great worth to the student himself as well as those who come in contact with him. Since budget limitations or the lack of a nearby source for mosaic materials exists in some school areas, mosaics are only read about in magazines, and the actual enjoyment of making them cannot be experienced.

Mosaics of Wood

There is a great possibility for all to enjoy this fast growing art in the form of *mosaics made of wood*, and at the same time provide an answer for that eternal problem in the woodshop in knowing what to do with those short scraps which you should keep but have no place to store.

Woods of all kinds and types provide an excellent source of mosaic material. Since waste scraps can be utilized, the initial cost can be held at a minimum. The size of the mosaic can be determined by the individual and may be in the form of a round or rectangular table top, a wall plaque, a plant holder, or attractive gift item.

Various shades can be obtained from different kinds of wood. Some of these are as follows:

Reds: Cedar, redwood, Philippine mahogany.
Creams: Whitewood, white pine, ash, Limba, white oak.
Greens: poplar, cottonwood or tulipwood.
Light browns: Alder, cherry, birch, maple, beech, kotiva.
Dark browns: Honduras mahogany, black willow, walnut.
Black: Quebrocko, Ebony, Teak, Rosewood, Ironwood.
Purple: Often seen in poplar or black willow.

For best results cut blocks ¾ by ¾ by ½ in. in size, and store the pieces in cleaned empty food tin cans from the cafeteria. You may find it rather difficult to cut blocks this size, since small pieces have a tendency to kick back when cut on the table saw. Rip several strips from ¾ stock, ½ in. wide, and as long as the "scrap" piece is. Pass these through a 4-in. fence set ¾ in. from a band-saw blade. If a fence is not available, construct one of two pieces of plywood about 4 in. wide and as long as the band-saw table is wide. Nail them at right angles and block with triangular blocks for rigidity. "C" clamp this fence ¾ in. from the band-saw blade, and proceed to cut your blocks without trouble.

Mark each tin can as to kind of wood and color or texture and prepare a liberal supply for the next step.

When you choose your pattern try a free form, animal, or flower form in abstract form, or some design to your liking and lay this out on a suitable piece of ½-in. plywood or thicker. We have used points of the compass and the school emblem, the spartan, as good starting projects. Next pencil in the pattern as accurately as possible and determine which color woods will best fit the pattern in their proper contrast.

Using hide, fish, casein, resin, or other type of glue, dip each block and set in place on the plywood. Run the grain in all directions and make cuts with a sharp single edge razor blade where parts must be fit into tight corners or details. Using care, finish the entire mosaic as you would using tiles. After the glue has set sufficiently long, apply a mixture of thin wood dough or crack filler and remove excess from face of project.

Finishing the Mosaic

When filler (grout) is thoroughly dry, carefully sand with a belt sander and finish in the usual way, sealing the surface with several coats of white shellac and finally with clear lacquer. You may wish to apply a coat of fiberglas to make it waterproof. Next add a suitable frame, and finish your project into a "conversation piece" coffee table or wall plaque. You will be amazed at the appearance of the project itself.

The Spartan head illustrated is the official emblem of Camelback High School, Phoenix, Arizona. The plaque measures approximately 2 by 4 ft., and is made of white ash, white oak, cedar, mahogany, ebony, poplar, and redwood. It has a shellac and wax finish.

A note of interest in the making of a wooden mosaic is the absence of weight in the finished project as compared with a tile mosaic, and it will bring just as many oh's and ah's as the genuine tile mosaic itself. It has so many applications as table tops, edgings for table and picture frames, and countless other uses. Try it and you will be amazed.

JUNIOR HIGH SCHOOL MEMORIES

BEN TAUBENFELD and **MIKE CONROY**
New York City Schools

Involving a wide range of processes, including linoleum block work, typesetting, letter press printing, etc., this junior high school graphic arts project was conceived as a supplement to the yearbook — which is bought by graduating ninth graders. Sold to seventh grade students (as an indication of its popularity, the first two printings were sold out in a short time), the booklet offers them a chance to keep an accurate record of events and memories during the next three years of their student lives.

The Procedures

A group of boys were selected to draw up various designs that would be used for the linoleum cuts to accompany the various subjects that would be covered: teachers, superlatives, social activities, school songs, "big wheels," etc. The illustrations, except for a halftone of the school building on the frontispiece, were all linoleum blocks.

As the drawings were submitted for approval and accepted, another group worked on the linoleum blocks. When completed, the blocks were glued to ¾-in. wood to make them type high.

At the same time, a third group started typesetting according to previously determined specifications.

The linoleum and the type were then locked up together and printed by the entire group on the shop's 10 by 15-in. press. Before printing, however, the 11 by 17-in. sheets were folded in half to obtain the 1¼ by 11-in. page size. Each folded sheet, therefore, provided four pages of the booklet. The trim size of the project was 8¼ by 11 in.

The final step was to put the pages together and staple them. The books were saddle-stitched using three staples and a hand powered stapling machine to do the job.

The Layout

A particularly appealing phase of the project for the students was making up the dummy of the booklet to determine the layout and the number of the pages. At this time, it was decided to use red ink for the body text (on three four-page forms of blue "text" stock) and blue ink for the cover (on one four-page form of white "gloss" stock).

sample pages of the memories booklet

A Graphic Arts Club Production

MY FAVORITE TEACHERS

7th Grade	8th Grade	9th Grade

Teachers

Superlatives

Best All Around

Most Popular Boy

Most Popular Girl

Smartest Boy

Smartest Girl

Wittiest Boy

Wittiest Girl

Best Male Athlete

Best Female Athlete

Boy Most Likely to Succeed

Girl Most Likely to Succeed

Prettiest Girl

Handsomest Boy

Social Activities

SOCIAL ACTIVITIES

Clubs

Dances

Parties

SPORTS

Sports

Baseball

Basketball

Volleyball

Badminton

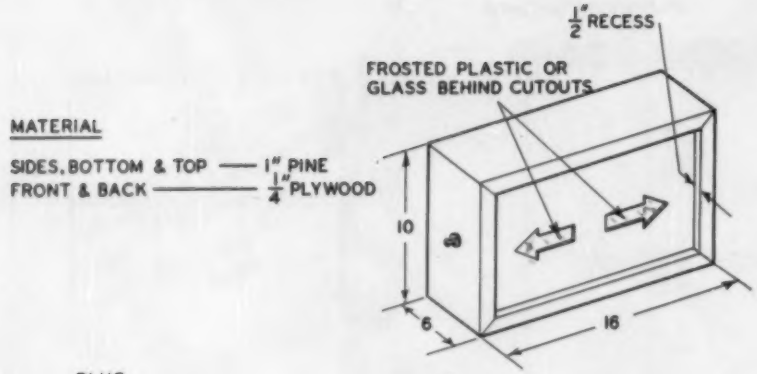
Gymnastics

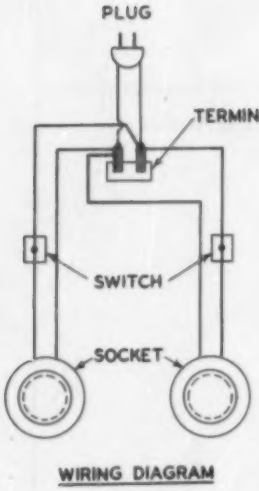
GRADUATION

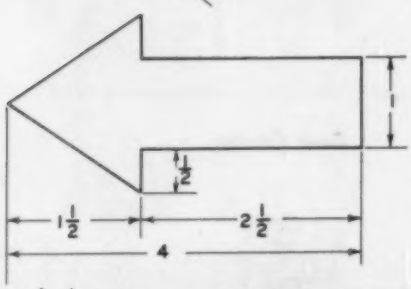
DATE _____

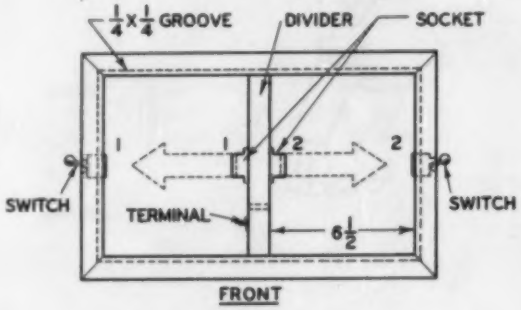
FOUL-A-CATOR

HARRY E. WOLFORD
Reynoldsburg, Ohio, High School



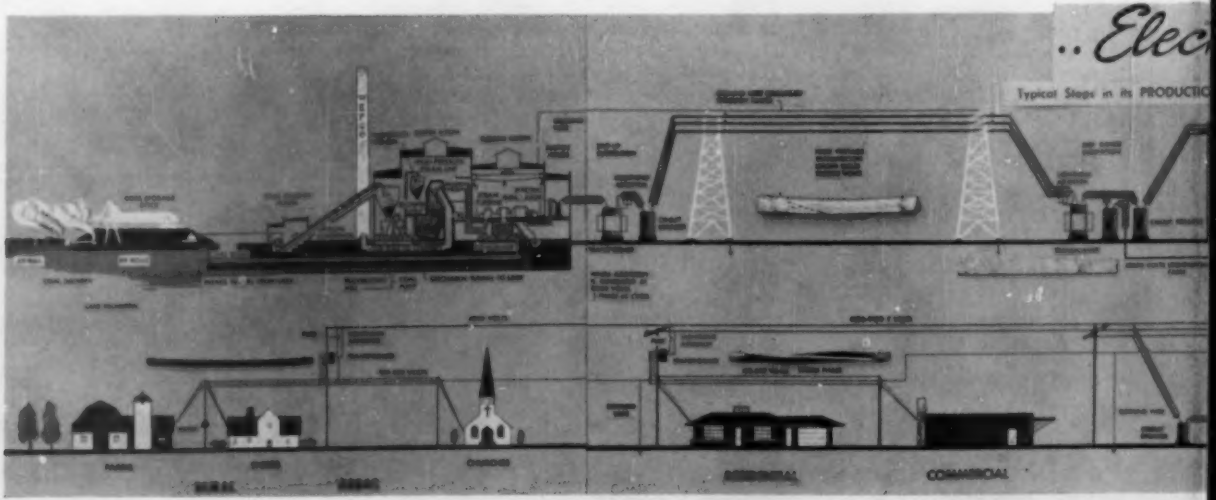






With the basketball season in full swing, the industrial arts teacher might bring this project to the attention of one of his students. It can serve to develop both woodworking and electrical skills and at the same time offer a solution to a problem the basketball coach inherited with the addition of the 1-and-1 rule to basketball (where such rules are in effect).

The 1-and-1 rule is activated after a



team has had a determined number of personal fouls committed against it by the opponent. Many coaches have found this to be a headache since the indication of the rule must come from the scoring table and must be on constant display to inform the officials before a decision by a glance toward the table. Cards, pieces of paper, and metal plates have been used, but in most cases they are not satisfactory and look very "messy."

The indicator described here has self-contained switches and is designed to set on the scoring table facing the playing floor. However, a remote switching system can be installed in situations where it is more desirable to place the indicator in another location.

Construction Procedure

1. Cut sides, top, and bottom to size. Cut groove ¼ in. wide and ¼ in. deep ½ in. from front edge in each piece.
2. Cut front and back from ¼-in. plywood. Cut out the arrow indicators in front panel with jig saw. Mount frosted plastic or glass over cutouts on the back of this panel.
3. Fasten sides and bottom together with glue and screws. Place screws through bottom for neat results.
4. Slide front panel into groove after putting glue around edges.
5. Set top in place. Use glue blocks in inside corners. Place brads or screws through these blocks for added strength. Mount sockets and terminals on divider; drill ¼-in. hole just below sockets and fasten it in place.
6. Mount toggle switches in place.
7. Using wiring diagram as a guide, complete wiring using lamp cord. Wire running to plug should be of length to reach power supply to be used. Take care to drill ¼-in. hole in back panel and run cord through this hole before attaching plug.
8. Place bulbs of 110 v. type in sockets. Use the desired wattage.
9. Fasten back panel in place using screws only. Glue or nails *should not* be used. This will allow removal of back for repair work.
10. Sand carefully and apply a flat black paint to eliminate glare and to emphasize indicator lights on front panel. ◀

AN ELECTRICITY MURAL

NORMAN EBERHARDT

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Custer High School, Milwaukee, Wis.

In developing the electrical course at Milwaukee's Custer High School, it soon became apparent that a major flaw or deficiency was a unit that would acquaint the student with the production and distribution of electric power before its use in the laboratory. To overcome this lack, we contacted the local Wisconsin Electric Power Company, told them our problem, and asked their suggestions for overcoming it.

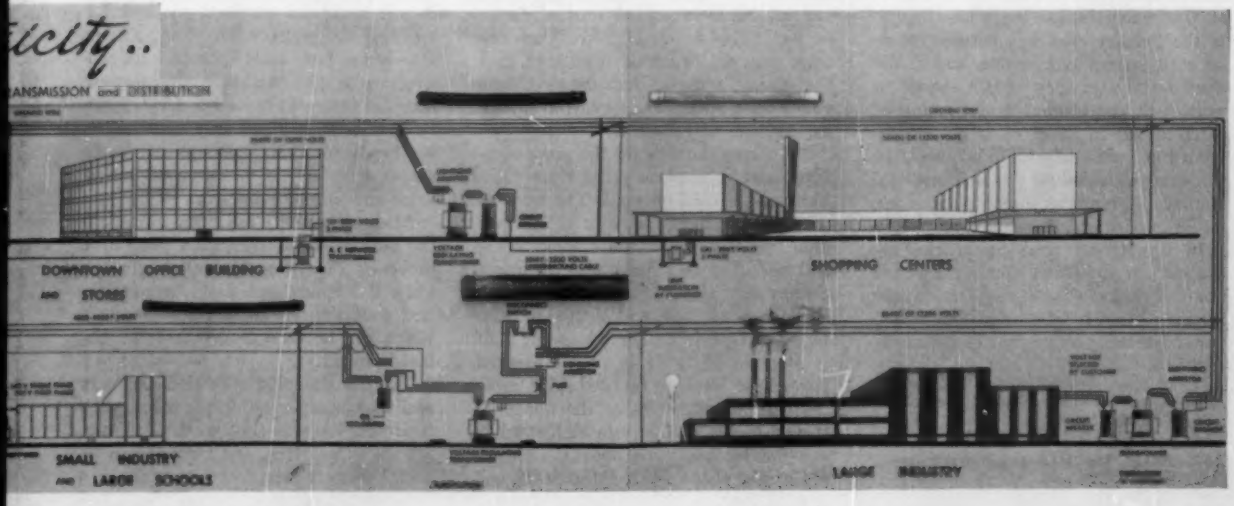
The result was a mural showing the distribution of electric power in the area. It shows the generation of power, as well as the transformation and voltages used for transmission with actual samples of cable and wire mounted on the mural.

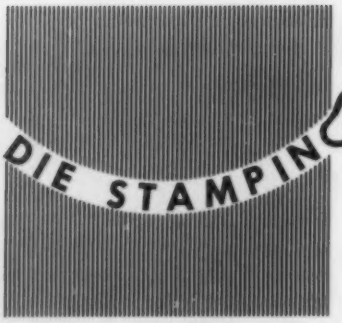
Users of electricity are depicted in sketch form. The voltages and various types of power centers are shown for each user.

Not only does the mural show the schematic electrical distribution system, but it can vividly portray the vast amount of equipment and skill needed to keep a vital industry in operation. Problems in mathematics must be solved on computers, accounting systems operated, real estate purchased to obtain right away, construction of transmission facilities, and electricians to wire the equipment.

The backing material was tempered masonite, painted with latex base paints. The wire was a stick-on device obtained from a local manufacturer. After mounting, it was sprayed with a clear plastic to keep it clean, and this serves the purpose very well.

It is now available to both the students and the teachers on the wall of the electrical laboratory where it is not only serving its original purpose, but is also used to teach related mathematics, science, spelling, and other allied subjects and to bring industry into the classroom. ◀





IN THE SCHOOL SHOP

JAMES NELSON
Wilson Junior High School
Rockford, Ill.

Many items produced by American industry contain metal parts or are manufactured by machines made of metal parts. Although machining methods make up the largest group in the metalworking trades, other principal methods such as casting, forging, and stamping have been making an important contribution to the shaping of metal.[1]

In school metal shops, students get a chance to become acquainted with some of the machines for machining metal. In the foundry area they become familiar with casting and forging, and in the sheet metal area they have a chance to work with the bending and forming of sheet metal. In order to meet the objective of industrial arts to acquaint the students with industry,[2] the principal method of stamping should also be put into a good metal program.

In commercial practice, articles are stamped or drawn in dies on a power press. Press products familiar to the layman consist of automobile body parts, kitchen ware, metal lamp stands, silverware, coins, garden tools, and a multitude of other items. Many items now made by pressing were formerly made by casting, forging, and machining.

The stamping operation may be approximated to the manufacture of a simple object, such as an ash tray in most school shops. The stamping operation can be used with numerous materials such as aluminum, copper, zinc, or plastics. Operations such as cutting, buffing, heating, polishing, and etching can all be incorporated into a simple project. The finished project, an ash tray, coaster, or small dish, will give the student a useful item for any home and a basic understanding of the stamping method of industry.

In making the dies for the press operation, maple or some other close grain hardwood should be used. The wood is mounted on the face plate of a wood lathe and turned to the desired shape and size. The dies illustrated are for a coaster but alterations should be used depending on size and shape of material and project. The lower die half is recessed 1/8 to 1/4 in. to the desired size of the blank to be used. The upper die half, which serves as the punch, is turned to the desired size and fitted in position by means of dowels. Depending on the shape desired, the depth and diameter of the lower die half should be regulated. If a fairly smooth project is desired the blank holding portion in turning the lower die half should be slightly less in depth than the thickness of the blank that is to be drawn.

This makes it possible to press out most of the wrinkles that may have formed in the flange of the object during drawing. There are numerous devices that can be used for the drawing operation. If a small arbor press is available, it will make an excellent method for applying the pressure. However, a large vise or car jack could be used with satisfactory results. Although this method does not insure as smooth a draw as can be obtained on a power press, it does make possible the production of simple shapes without the necessity of having large and costly equipment.

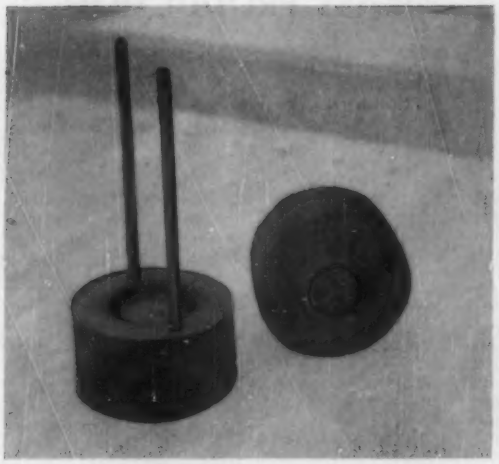
After the project has been formed to the desired shape, numerous decorative processes can be incorporated into the project. Etching, polishing, hammering, and anodizing are just a few methods which can be used to decorate the finished project.

The die stamping operation can very easily be incorporated into a school shop program. Projects such as small dishes, ash trays, coasters, and buttons can be useful and are inexpensive to make.

[1] United States Bureau of Labor Statistics, *Occupational Outlook Handbook* (Washington: Government Printing Office, 1957), p. 336.

[2] Emanuel E. Ericson, *Teaching the Industrial Arts* (Peoria: The Manual Arts Press, 1946), pp. 251–252.

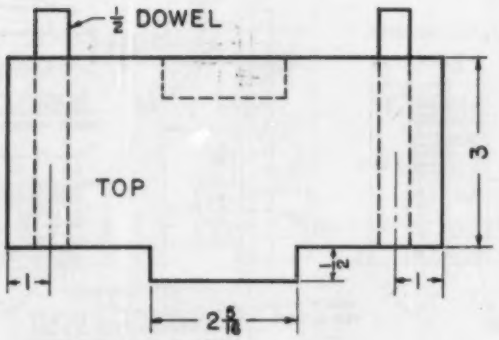
three stages in die stamping an ash tray

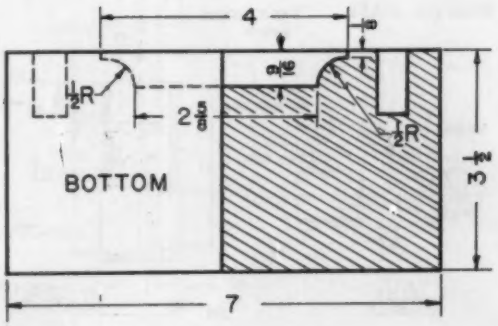


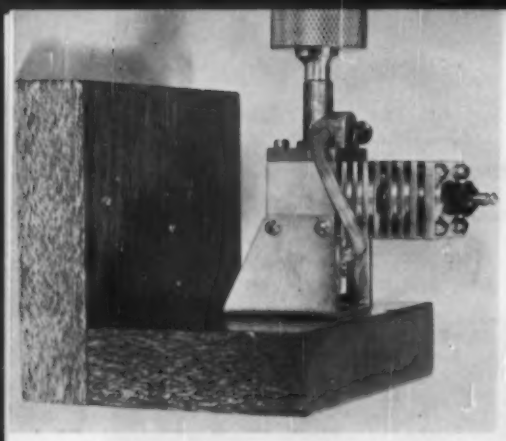
Male and female dies

Bench hand press with mounted dies

Final die stamping operation







ADAPTING A PROJECT TO MASS PRODUCTION

JOHN R. WALKER
Supervisor of Industrial Education
Board of Education of Harford County
Bel Air, Md.

Mass production projects are becoming increasingly more popular as a medium of instruction in the school shop. There are many reasons for this popularity:

1. The major portion of the work done in the school shop is of an individual nature. Mass production offers an opportunity for the practical application of "teamwork."

2. The mass production project makes it possible to emphasize and illustrate the necessity for tolerances. One of the important characteristics of modern productive procedures is the interchangeability of parts. It is because the various units are made interchangeable that the modern assembly is possible.

3. The production problem, if planned correctly, enables the student as an individual and as a participant in a group to take an active part in planning and problem solving. It is vital that the student see the importance of working in an orderly and planned manner.

4. The interpretation of industry is possible in a practical manner.

5. History can be presented in an interesting and understandable manner.

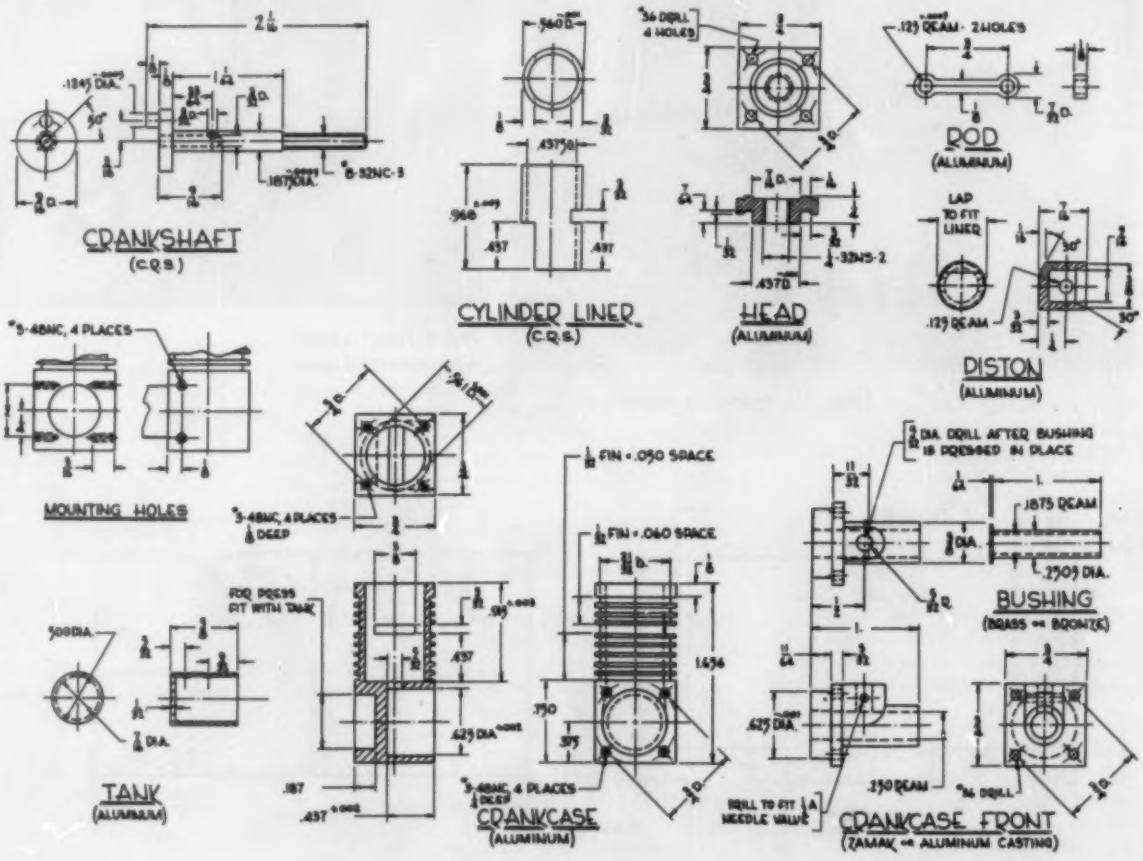
6. The mass production problem offers a challenge to all the students in the class, regardless of their ability.

The project presented herein was an attempt to discover if the above were true.

The idea for starting a production problem came about during work on a unit of American Industry. A planning group was established to investigate the possibilities of such an undertaking. The group also set about to discover what had been done by other shop classes and to search for a suitable project. The miniature engine was the choice. Various other groups then were established to prepare drawings, construct a sample engine, design tools, jigs, fixtures, molds, etc., plan and set up a safety program and a production line. A training program was also instituted.

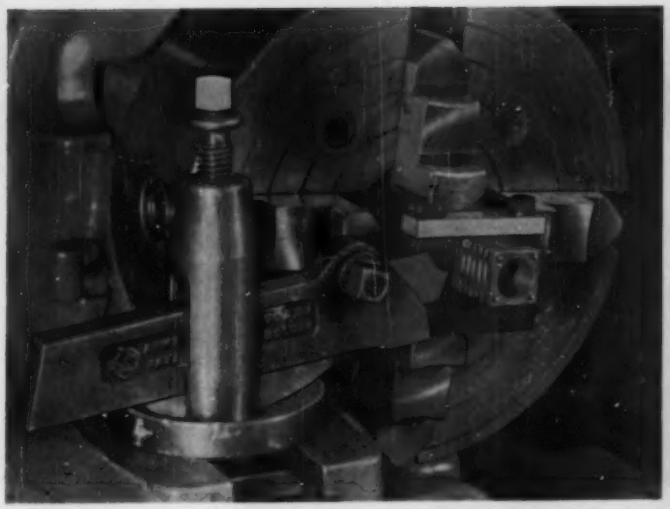
With much planning and preparation the project was started and 24 engines were constructed. All of them ran. It must be emphasized that this was not the only work done by the senior students. This same class produced many other individual projects. The project consumed five weeks of the school year.

It is realized of course that mass production problems are not cure-alls, nor are they the road to easy teaching. They are only one of the many media the good instructor employs to stimulate his students.

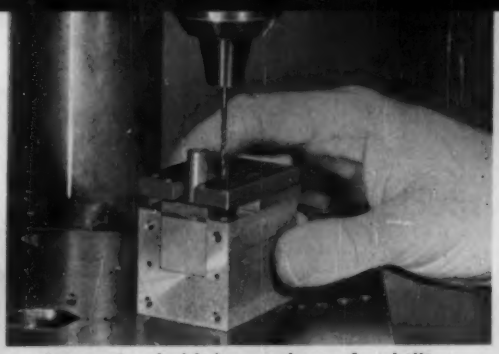


Adapted from the author's Projects for Metals, published by Goodheart-Wilcox Co., Inc., 1322 S. Wabash Avenue, Chicago 5, Ill., paper, 80 pp., $1.75.

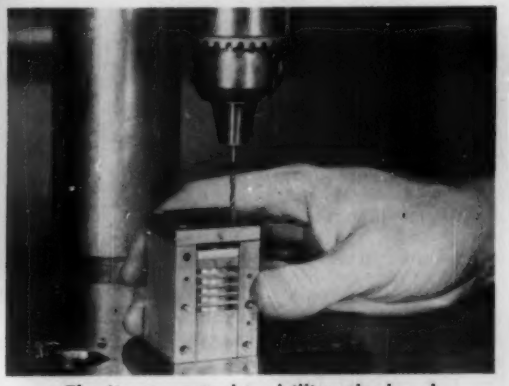
several operations in mass producing the engine



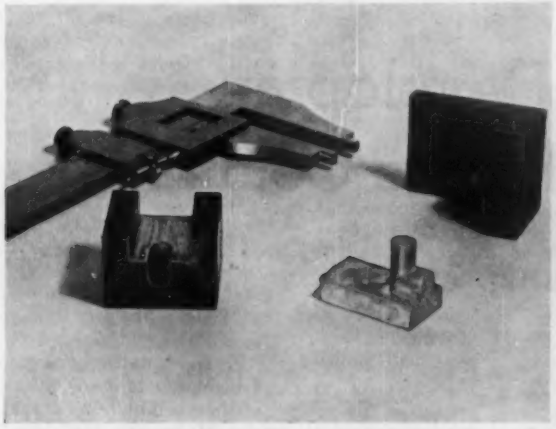
Fixture used to hold the crankcase during the finning operation



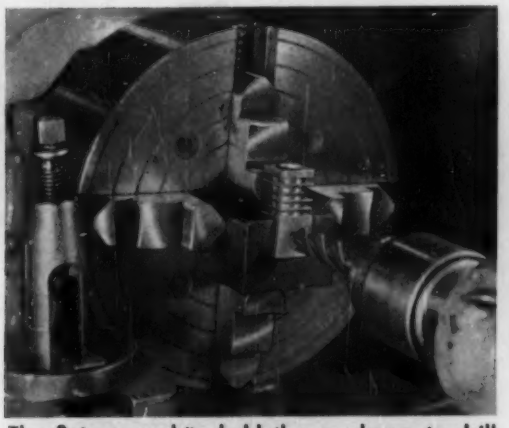
Jig used to hold the crankcase for drilling the mounting holes



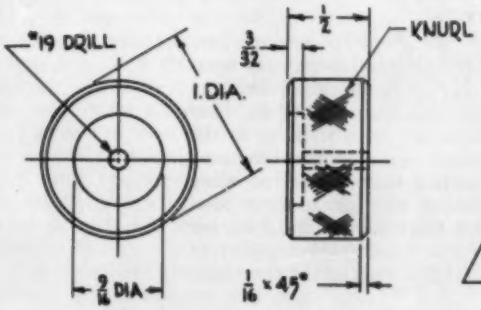
The jig converted to drilling the head mounting holes



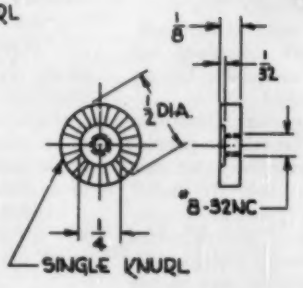
The mold used to cast the crankcase front



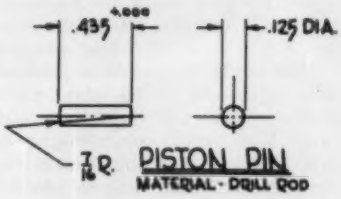
The fixture used to hold the crankcase to drill the fuel tank mounting hole and the hole to receive the crankcase front



FLY WHEEL
MATERIAL - BRASS



DROP WASHER
MATERIAL - C.R.S.



PISTON PIN
MATERIAL - DRILL ROD

IA/VE
special / report

▶ from the industrial arts point of view —

How to Develop an Auto Mechanics Course

WALTER TRASIN

A point of view is a perspective, a way of looking at something. The thing that we see depends partly on where we stand when we look at it. As industrial arts teachers planning a course of instruction in automotives we are looking at the automotive industry. We see the products, tools, and people of the industry. The vocational teacher also looks at the same giant industry when he plans his work. So does the salesman. Do we all see the same thing?

The salesman sees an automotive tool or product to be sold to people. He plans his presentation with this objective clearly in view. He knows exactly what he is trying to accomplish and the record of sales tells him how well he is achieving his purpose.

The vocational teacher sees people who are to be trained for employment in the automotive industry. The tools and products of the industry are viewed in relation to the skills and knowledge to be taught. He too keeps his objective in clear sight as he organizes his course of instruction. The record of successful placement of his people tells him how well he is accomplishing his purpose.

Industrial Arts and the Automotive Industry

When we industrial arts teachers look at the automotive industry what do we see? Is it the same thing the vocational teacher sees? If so, then perhaps we are both standing in the same place. In this case someone might suggest there is one too many of us. One of us ought to move over.

In most cases the vocational teacher has spent a considerable number of years actually working in the trade.

Mr. Trasin is an instructor of industrial arts with the Montebello, Calif., Unified School District.

Since his job is to prepare his people for direct entry into the work of maintaining and repairing the products of the industry, the equipment he uses is that which is currently used in the industry. In addition, he is aided by committees composed of qualified people from all phases of industry and from education. These committees establish standards and objectives based on the needs of the industry.

There may be some disagreement among this vocational group regarding the degree of specialization which is desirable — current opinion is that basic skills and basic knowledge should be emphasized, leaving highly specialized training and advanced technical information to the manufacturer and dealer. There is, however, clear-cut agreement on the objectives of the training program, and these are to train people in the skills and knowledge required for employment in the automotive industry. The vocational teacher is qualified by experience and training, and has the philosophy, equipment, and backing of industry to support his position. He is in his rightful place.

But where do we stand? Finding the answer to this question is the first step in planning our program. Perhaps it is the most important step. Certainly it is the place from which we must begin.

Objectives of Industrial Arts Education[1]

We can start by examining the objectives of industrial arts. Over the years many statements have been made regarding the desired outcomes of an industrial arts program. These generally include consumer education, occupational exploration, leisure-time activity, and a dozen or more others. At this point we may fall into a trap. It is a simple matter to read the list of objectives, and then, since they all appear to be worthy, copy them on a sheet of paper which we include in our course outline. If this is as far as we go, our action will not provide us with objectives in any real sense. There is such a thing as incidental learning, but since we have little control over it we cannot depend on it as a means of reaching our goals. If we expect to achieve our objectives they must be consciously built into the course of instruction, not left to develop out of some mysterious power.

The objectives themselves are extremely broad. Perhaps this is as it should be, although it almost seems that industrial arts is laying claim to all of life. It is unlikely, and it is probably not intended, that any particular course will achieve all the objectives listed. Perhaps some could be more readily attained through courses other than industrial arts. In any event, we would probably be wise to narrow our view a little. With this in mind we will examine the list of objectives to find those which are particularly appropriate for an automotive program. From this list we will select one or two, possibly three!

To develop understanding of industry in terms of organization, raw materials, processes, products, occupations, and services.

To develop appreciation of the influence that industry has on our social and economic life; and the ability to select, care for, and use industrial products intelligently.

To develop a reasonable degree of skill in the use of tools, machines, and materials; and understanding of basic types of construction, repair, and maintenance.

To develop sound practices, attitudes, and appreciations of safety in the school shop with application to the home and everyday living.

To offer opportunities for the development of constructive leisure-time activities or hobbies requiring mental and physical activity.

To satisfy the creative desire of youth, regardless of professional or occupational interest, to construct useful articles with tools and materials.

To develop the ability to measure and calculate, and to use scientific information, graphic illustrations, and reference materials effectively in the activities.

To develop the ability to plan and work, alone and in co-operation with others, toward the orderly, efficient, and complete performance of assigned and selected tasks.

To develop appreciation of good design, construction, and craftsmanship.

To discover and develop personal aptitudes, interests, abilities, self-reliance, good judgment, and resourcefulness through problem-solving and self-expression.

To enrich other instructional fields such as mathematics, science, and language arts by bringing theory and practice closer together through illustrations and practical applications.

To develop understanding of conservation and the sources of the basic materials that provide resources for man's comfort, health, and enjoyment.

To provide information and exploratory experiences in various industrial occupations and industries that will help the student make a wise selection of his life work.

To provide opportunity for certain students to have more advanced experiences within chosen occupational areas.

As we look through this list we find a wealth of material. The first objective alone easily contains enough for a full year of instruction. This is industrial arts in its broadest and most fundamental application to our industrial society, and is an area in which at present we pay only lip service. This is true of several of the other objectives; for example look at the first half of the second objective. This single statement covers a tremendous area. The auto shop might well be used as a laboratory for developing this kind of understanding, but to do so we need to plan for it.

Selected Objectives

After studying the list, however, we will select the following objectives which are somewhat more limited in scope:

Understanding of basic automotive operation, maintenance, and repair, and the development of a reasonable degree of skill in the use of tools.

Development of ability to plan and work, alone and in co-operation with others, toward orderly, efficient, and complete performance of assigned and selected tasks.

We are now ready to organize our program in line with our objectives. We notice that we are standing next to the vocational teacher, but not occupying his place. Had we selected the first objective on the list we would be standing a considerable distance away. We keep in mind the fact that we are not training our people for direct entry into the automotive service trade, although some will follow that work. A larger group will do work allied to the automotive industry, and almost all will own and operate automobiles. Knowing what we are trying to accomplish, we are able to evaluate each proposed activity in the light of its contribution to our purposes. We are selective. We can distinguish between purposeful activity and busywork, which is activity for its own sake. We can avoid meaningless digressions.

Equipment Needed

What kind of equipment do we need in order to teach the principles of automotive operation, maintenance, and repair? First we look at the shop itself. Its design, size, location, and accessibility will have a certain limiting effect on our program. The ideal situation would be to construct the facilities to fit the program, but in most cases we inherit an existing shop which in many ways may be inadequate. New shops do get built, however, and we may have a part in their planning. In the meantime, improvement of the shop facilities is often possible. We also keep in mind that there is usually more than one way to approach our goal. The important thing is to know what the goal is.

[1]Guide for Industrial Arts Education, California State Dept. of Education, Sacramento, 1958.

Our students will be primarily automobile owners and operators. Our goal is to develop their understanding of basic automotive principles. The automobile is our major item of equipment. Since the automobile is made up of many functioning parts we need to select certain areas for emphasis in order to keep our program in line with the needs and interests of the students and to keep within the time limits of the course. We select engine operation, with emphasis on ignition and fuel systems, transmissions, and brake systems. This will be the core of our program. To it we will add other related units of instruction.

Ideally we might want to provide an automobile for each two or three students. Of course this is impractical for many reasons, cost and space being two obvious ones. Since many of our students have their own cars or have access to the family car, we will make use of this resource in our program. Working on a car provides an incentive for many students, adding variety to the course organization and providing the opportunity to strengthen learning with practical experience. In beginning auto shop classes we will plan to work on cars an average of one day per week. The work will grow out of the material we have studied and will include ignition and fuel service, brake adjustment, wheel and tire service, etc. In order to justify this activity there must be sufficient work to employ all members of the class, otherwise it will become a period for loafing and mischief. To do this usually involves from five to eight cars, with the students working in crews of two, three, or four, depending on the kinds of jobs which are to be done.

From time to time, students will be asked to bring in their cars for the purpose of demonstration (for example, removing and replacing a distributor). In these instances, students who bring their cars receive extra credit for having contributed to the instructional program. Ample work space needs to be provided in and immediately adjacent to the shop, and students should be assigned parking spaces near the shop to eliminate the problems involved in going to and from the general parking area.

In addition to the students' cars, we need to have several live engines. In the event that our shop facilities limit the use of students' cars it is especially important to have these engines for demonstration purposes. Other equipment will include the various automotive parts which we are to study. Our next step in organizing our program is to make a list of these parts and develop units of instruction for each. As an illustration let us plan an instructional unit for the ignition system.

Ignition System Instructional Unit

We might introduce our unit by asking if any of the students ever had trouble with the ignition system of his car. Several students are sure to respond with accounts of their difficulties. Then, referring the students to the textbook and other reference materials, we will make the following assignment, to be completed by the class in their notebooks: (1) list the main parts of the automotive ignition system, and (2) sketch the wiring diagram of an ignition system.

After the students have completed their assignment, we ask several volunteers to bring their cars to the shop (or we use our shop engines). We trace out the ignition system, from the battery to the spark plugs, asking individual students to identify primary and secondary wires as well as the various parts.

Returning to the classroom, we have a quiz on the material we have covered so far. We will have frequent short quizzes. This helps to sharpen up the instruction and gives us a check on how the material is getting across to the students.

A variation of this type of quiz, and one which is popular with the boys, is to sketch on the chalkboard, in nonsequential order, the components of the ignition system and related parts — battery, solenoid, starter, ammeter, ignition switch, coil, distributor cap and rotor, contact breaker points, condenser, and spark plugs. Each student in turn goes to the board and sketches one of the connecting wires. After the first wire is drawn, all others must be drawn in sequence. Usually the first boy will draw the easiest connection, the ground strap on the battery, and everyone will groan because this is the connection each wanted to draw. Then the others will have to think out each connection as their turns come. There is quite a lot of interest, not too much pressure, and considerable learning for many.

Next, we demonstrate the electromagnetic principles involved in the operation of the ignition coil. Using mock-ups we show how the high-voltage discharge occurs as the breaker points separate, and we also demonstrate the effect of the condenser. We then demonstrate the use of the coil and condenser testers.

As a change of pace, demonstrations by students themselves can often be an effective method of presentation. When a student attempts to instruct his classmates, a dynamic factor seems to be injected into the situation which encourages learning by both the student and his audience. In order to set up this situation, we make a class assignment, listing sources of reference and providing mock-ups and other teaching aids for reference. After the class is well started on the research, we ask who would like to explain and demonstrate the unit which is being studied. The chance for extra credit and the opportunity for leadership will usually bring forward several candidates. A relentless barrage of questions from the class usually forces the student to work out a clear and detailed presentation, and results in enthusiastic learning by all concerned.

We now begin to study the distributor. We ask, "What are the purposes of the distributor?" The students examine distributors to become familiar with the parts and see how they function. Using a large distributor mock-up, wired to a battery, we demonstrate the distributor in action. Then we make a reading assignment. This assignment is to prepare the student for actual work on the distributor. We ask the students to:

List the parts which should be included in a check of the ignition system.

Tell how contact breaker points should be cleaned.

List the causes of burned contact points.

We discuss this material, and then demonstrate how to service a distributor, including removing and replacing points, testing spring tension, aligning the points and adjusting the gap. A distributor is issued to each student and he performs similar operations. Afterwards, we discuss the experience and note some of the problems encountered. Then we have a quiz on the material we have covered thus far.

The next time we work on cars, we will find many of the students ready to replace the points and condenser in their ignition systems. Problems will arise in this actual work experience which were not met in the laboratory. Discussion of these problems provides an excellent opportunity for review.

We will discuss cam angle and show how to use test equipment to check cam angle on a car. Following this demonstration, students will be eager to check cam angle on their cars.

We are now ready to introduce the idea of ignition timing. We ask, "Why is it necessary to time ignition? Where is the timing mark located? How do we connect the timing light? How do we change timing?"

Using a cutaway engine which shows the piston, we demonstrate the principles involved, and then we locate the timing marks and check timing on several cars in the shop.

Now we find there are some other things we need to know in order to time an engine. First, the students will become familiar with the cylinder location and firing order of their own cars and will record this information in their notebooks. Then they will note the direction the rotor turns and learn how to place number one piston TDC on compression stroke.

Then we remove all the secondary wires from an engine and hand them to a student, telling him he now knows enough to replace these wires correctly, even though there is no identifying marking either on the distributor cap or the wires, and all the wires are of the same length.

At first he may be dumfounded, much to the delight of his fellow students, and it might require a few leading questions to get him started. When he has worked this one out, however, he feels he has really learned something!

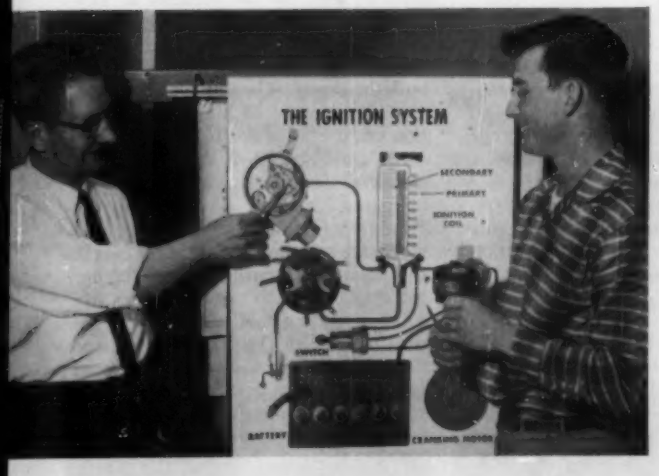
Following this, we assign a similar activity to all class members, using a number of cars, with crews for each car so that all students may participate. Students remove, clean, and replace the secondary wires, distributor cap, and rotor. It is a good idea to have a few spare distributor caps and rotors on hand in case of breakage.

Next we demonstrate the removal of the distributor itself. After the distributor has been replaced and the engine timed, students participate in a similar activity, working in crews. This time we have a contest to see which will be the first crew to replace the distributor and start the engine.

We have another quiz to check on our progress and we study the centrifugal and vacuum spark advance units of the distributor, using a distributorscope to demonstrate these mechanisms in operation.

Having a fundamental knowledge of the ignition system, we are now ready to develop some trouble-shooting procedures so that we will be prepared to make a systematic check of any ignition system. We work our methods out during class discussion and the students record the procedure in their notebooks, step by step. We go through the trouble-shooting procedure on several cars in the shop. Following through a step further, we place defective parts and connections in our shop engines. The students try to locate the cause of trouble and correct it. This activity can be organized as a demonstration, with several students doing the work and the rest of the class observing. Another approach would be to install the same "trouble" in several engines and have a contest among the students to see which crew succeeded in starting their engine first.

As our final phase in the study of the ignition system, each student is issued an ignition mock-up, a unit which includes coil, distributor, primary and secondary wires, and simulated spark plugs. The student completely disassembles the distributor, then installs all parts (centrifugal weights and springs, breaker plate, contact points, condenser, insulation, pigtail, etc.), adjusts points, and connects primary and secondary wires. When a battery is connected to the unit and the distributor shaft is rotated, high-voltage sparks will jump the gap at the spark plugs, providing the student has done his work correctly.



In the area of auto mechanics industrial arts, "we need to take time to evaluate our work; to give thought to where we are and where we are going."

Tools and Equipment

While we planned our instructional unit we made notes of the tools and equipment that we will need in order to carry it out. In addition to the students' cars and shop engines which have already been mentioned, we need an adequate supply of hand tools and the following special tools and equipment: ignition tools, torque wrenches, timing lights, coil and condenser testers, cam angle meter, and distributor tester. We also need: plywood for the mock-ups; coils, condensers, and distributors; angle iron and angle brackets for the simulated spark plugs; small screws and nuts to fasten the parts to the plywood; primary and secondary wires. There will be 24 of these units, one for each member of the class. We must, therefore, plan storage space for the mock-ups when they are not in use. A systematic check must be maintained on all work units, both for evaluation of student progress and for maintenance of the units themselves. Unless this is followed through consistently, the storeroom will soon contain worthless assortments of odd parts.

Each unit is numbered and has a place in the storeroom. When issued to a student, the number of the unit is recorded on a check sheet opposite the student's name. He is responsible for the unit. Also recorded on the sheet are the various steps in disassembling and checking. Since the project may take several days to complete, the student needs a locker in which to keep his unit until he is ready to check it in. After the work has been completed and checked, it is returned to its place in the storeroom, ready when needed for the next class. In this way, 24 units will serve 48, 72, 96, or 120 students, depending on the number of classes, since each class will be studying a different unit at any given time, but all will eventually cover the same material.

The Second Objective

Instruction on the ignition system has been organized in line with our first objective, which is to develop understanding of basic automotive principles and some degree of skill in the use of tools. We have tried to do this in a methodical manner, starting from simple operations and working toward those which are more complex. Each step of the way, we have attempted to provide an opportunity for the student to get his hands on and actually work with the unit he is studying.

Up until now we have been dealing with tangible aspects of the program, specific information, materials, equip-

ment, etc. Now we begin to plan for our second objective, one which is less tangible but equally important, the development of good work habits. We want to develop in our students the ability to work toward the orderly, efficient, and complete performance of tasks. We will encourage independence as well as co-operative work with others.

The fact that we have an organized program of instruction is itself a long step in the direction of our second objective. Having clearly defined goals, we know where we are going and this awareness is soon felt by the students. On the other hand, lack of organization may lead to confusion. We may run out of work and attempt to fill time with purposeless activities. We might find that we are expending more energy resolving conflicts with students than in teaching.

Tight Classroom Control

Organizing the classroom and shop activities toward development of good work habits involves, first of all, the establishment of standards of behavior. Tight classroom control does not insure that there will be a great deal of learning, but without control we can expect little progress toward our goals.

Much of classroom behavior, both good and bad, is learned behavior. As in any skill, constant application and training will yield results. If we establish standards of desirable behavior from the first day and maintain them during the entire year we will have a situation favorable for the development of good work habits. In this connection, it is not important to make up a list of "do's and don't's." What is important is to have clearly in mind the kind of situation we want and demonstrate by consistent action that this is the way it should be.

There are certain key areas for the development of behavior standards. One of them is concerned with entering and leaving the classroom and shop. If possible, we will be at the door for a friendly greeting to the boys as they enter, detaining in casual conversation those few who may be boisterous. If the problem persists we will schedule an after-school conference with these boys, not as punishment, but in a sincere effort to get at the cause of the problem.

At the end of the period the class will wait for dismissal by the instructor or the shop foreman. If there is a tendency toward a mad rush to exit, we might recall the class for an orderly exit, or set up a row-by-row or work-station dismissal procedure. In all instances the procedure will be matter of fact, "this is the way we do it here." When the pattern is established and consistently followed, it will be the "natural" thing to do.

Another key area for control occurs during classroom discussion and demonstration. Here we will try to establish the habit of only one person speaking at a time, raising his hand for recognition, speaking loud enough for all to hear, and being listened to with attention by the others. We will start out this way and stay with it.

In the classroom and in the shop we will establish a pattern for orderly behavior. In cases where an entire class goes to work in a noisy or careless manner we may recall them to their seats, and after they have settled down, the class will demonstrate "how we go to work." One demonstration may be enough or more than one may be required.

Behavioral Problems

In individual cases, where words of caution do not produce the desired change in behavior, we will quietly separate the offending student from the class activity, with an accompanying loss of credit for the day. If the undesirable behavior persists, we will discuss the problem thoroughly with the student in private. Again, we will not use this after-school conference as punishment, but will search for causes and try to work with the student to improve the situation. In some cases, however, it may be necessary to drop the student from the class.

Many behavioral problems tie in closely with the problem of safety in the shop. We can make this relationship clear and use it as a basis for discussion with the students.

A well organized shop personnel system can be another positive factor in the development of good work habits. The key man in this organization is the shop foreman. In each beginning class we will have one advanced student whom we have selected for his qualities of leadership, mechanical ability, and emotional maturity. Since he is usually older and more experienced than the average student, his attitudes and behavior will greatly influence the others. His job will be to assist the instructor, aiding in demonstrations, checking the work of other students, and taking charge of clean-up at the close of the period. From this group of superior students may come some of our future industrial arts teachers. As we work closely with our foremen each day, we will find many opportunities to provide experiences which will give them insight into the nature of our work as teachers. These experiences and our confidential relationship with them regarding the problems of the day lift them to a new level of development, above and beyond their formal schooling, and will be of value to them regardless of their life work.

The shop clean-up activity itself, thought by some to be a necessary evil, actually serves a larger function than getting the shop clean. As much as any other activity, it can be an opportunity to build habits of orderly, efficient, and complete performance of tasks. Since it is continuous throughout the school year, there is ample time for practice. For some students this may be their first experience with responsibility for menial yet necessary routine work. We will remember that students can also learn habits of carelessness and neglect if our situation encourages such behavior.

Good Work Habits With Tools

The use and care of tools provides another opportunity to develop good work habits. A good workman will respect his tools since he knows their value, both in cash and usefulness.

In all industrial arts shops it is necessary to have a workable system for supervision of tools and equipment, otherwise frequent losses will occur due to carelessness or theft. This is especially true of the auto shop where work is carried on outside as well as within the shop.

The grading System

Our grading system should contribute toward the development of good work habits. We will record a daily grade for each student, expressed in the form of wages. This is a composite grade which includes all activities for the day (workmanship, class participation, quiz scores, and conduct). This daily grade sheet may be seen by the student at any time. At the end of the week the daily wages are added and the total for each student is posted on the shop bulletin board. Thus at all times the student is aware of his relative position on the wage scale. When report cards are distributed, the student receives a simulated pay check which indicates his total earnings for the grading period. The report card grade is based on the student's earnings; the higher his earnings, the higher his grade.

This grading method seems to appeal to most of the students, perhaps because at their age the problem of earning money is beginning to assume great importance, and even this fictitious wage is desirable.

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THE BULLETIN BOARD

(Concluded from page 14)

materials will be published as a project idea monograph for distribution to the teachers of these curriculum areas.

The projects — developed in the areas of optics, heat, light, mechanics, electronics, sound, minerals, meteorology, earth science, biology, chemistry, and industrial design — fill a void for a great number of students interested in science but who have learned only scientific and mathematical principles without having had an opportunity for practical application. In using the machines, tools, and materials of the industrial arts shop, students benefit from the scientific problems they must solve and the skills they must develop creating the project.

Robert H. Bielefeld, associate supervisor of the state department bureau of industrial arts education, co-authored and supervised the workshop program.

— Dr. Ray G. Fales
Chief, Bureau of Industrial Arts Education
New York State Education Dept.

STATUS OF INDUSTRIAL ARTS IN OHIO

A fine example of research data needed to help keep industrial educators abreast of rapid changes in the jobs being undertaken by local district shop teachers, *The Status of Industrial Arts in the Public Secondary Schools of Ohio*, recently published by the Bureau of Educational Research and Service at Ohio State University, covers number and location of teachers in Ohio, age of teachers, salaries of teachers, shop organization and course offerings, nonclass activities of teachers, industrial arts class size, new facilities for industrial arts, schools requiring industrial arts of boys and girls, college preparation of teachers, teaching experience of teachers, and many other topics.

Intended for use by teacher trainers to adapt their programs to shifting industrial needs in Ohio communities, the book offers a wealth of data which pinpoints problems to be overcome in industrial arts education.

A limited number of copies of this bulletin are available to interested persons at no charge. It can be obtained by writing to *Mr. Willis E. Ray, assistant professor of education, College of Education, Ohio State University, Columbus 10, Ohio.*

DELINQUENTS IN OUR SCHOOLS

The school program which provides only for the college-bound and academically able students may make "second- and third-class citizens" of the less academically inclined, and as a result stimulate juvenile delinquency among those and other students with special emotional or cultural needs.

If schools are to fulfill the democratic tradition of universal education and equality of opportunity, it becomes the duty of the school system and the teacher to try to understand a delinquent's behavior and assist him to "adapt and live in such a way that he does not come into conflict with the legal-societal normative system."

Delinquent Behavior: Principles and Practices, the latest and final report of the National Education Association's one-year study of juvenile delinquency and what it means to schools, outlines a program of special significance to industrial educators for the identification of these potential delinquents and offers guidelines for helping them to achieve their potentials, especially in a "lower class" society.

There are eight basic principles presented in the book: (1) the classroom teacher assumes the major responsibility for early identification of the potential norm-violating youngster; (2) the teacher maintains an attitude toward all his students which recognizes and upholds the dignity and worth of every individual, including that of the norm violator; (3) the school provides help through curriculum adjustments to enable the full realization of equality of educational opportunity for all children; (4) the school develops an integrated system of special services to help the norm violator; (5) for the extremely disturbed, the school provides special facilities with special personnel; (6) the school works with the family to achieve what is best for the youngster; (7) the school works with law-enforcement and court personnel in all areas related to juvenile norm-violating behavior; (8) working with community agencies, the school has a leadership role in an effort to prevent and control delinquent behavior.

LAG IN TECHNICIAN TRAINING NOTED

"Our own current emphasis on excellence in theoretical and applied science is partly a result of the challenge from the educational dictates of the Kremlin," according to Dr. Edwin S. Burdell, president of Cooper Union, in the annual report to the trustees. "But perhaps we are failing to note the equal Soviet stress on the training of technicians, shop workers, and less-than-college-level teachers."

He said that American education had long been lacking in this field and added: "Fully as much as with the education of the superior student, I am concerned with the education of the average young person to enable him to fill that place in our society for which he is best suited.

"The fetish of a college degree, irrespective of talent, can be destructive," he warned. "To expose an average student to a curriculum designed for the exceptional student can be frustrating to the individual as well as to the society in which that individual can take an honorable and useful place."

The Cooper Union, a tuition-free private education institution in New York City, is observing its centennial this year.

DISTRICT VOCATIONAL SCHOOL NEEDS LISTED

According to a report by a group of vocational education experts, the five vocational high schools in Washington, D. C., are doing a reasonably good job with the resources that are available but they need better facilities and more student guidance.

The report called for better counseling to steer bright students who are college-bound into the vocational schools. Too often these attract only slow-learning students, it suggested, while guidance efforts are mainly directed toward precollege youngsters.

SEATTLE OFFERS I.B.M. COURSES

To keep abreast of automation needs in business, Seattle's Edison Technical School introduced 12 new I.B.M. classes in day school and eight classes in night school this fall.

All equipment has been rented from the I.B.M. Company, and it is expected that the student tuition fees will pay all the costs of rental. Classes cover the use of and development of skill in operating the I.B.M. key punch, sorter, collator, and accounting machines.

Six of the business teachers spent a major portion of their summer vacation learning office procedures in the use of the equipment, the development of skill in operating the machines, and the preparation of instructional materials.

surveying the school scene

- State educational agencies have nearly tripled their staffs of supervisor-specialists in science, mathematics, foreign languages, and guidance and counseling since the passage of NDEA.
- Since the tragedy at Chicago's Our Lady of Angels School a year ago, there are 4,500,000 children attending schools where their lives are safer from fire. Another 9,700,000 children are attending schools in which some fire hazards have been corrected.
- The country teacher averages $4,013 a year and the average teacher in a city school earns about $5,313. This is an improvement for rural teachers of four per cent since 1950.
- Student assignments beginning next September in the Atlanta, Ga., schools will be made without regard to race or color according to a school board plan.
- In a nationally publicized case, the chairman of the English department in Mount Kisco, N. Y., was discharged for "insubordination" by the board of Central District No. 2 for his refusal to file written plans for classroom studies two weeks in advance as required by administration policy.
- In a recent issue of *The Saturday Evening Post* Vice Admiral H. G. Rickover charged "Too many of our schools are glittering workshops where training is the essential goal. Let us turn them into institutions devoted to education, with training given on such marginal status as it traditionally has had — sewing for the girls perhaps and some mechanical training for the boys. Let us stop our schools from teaching children how to dress, shop, telephone, cook, drive, or find a mate."

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arc process, accessories, exercises in arc welding, arc welding equipment, identification of metals, and metals and their structure. Profusely illustrated, the manual contains 337 line drawings, halftones, and tables.

For information on the "Arc Welding Training Manual," write to the American Welding Society, 33 West 39th St., New York 18, N. Y.

on turret drilling

"Drama in Drilling," a new booklet on the principles of the new technique of turret drilling features case histories of applications of this type of machine with information of materials, tools required, and operations. Applications include random hole patterns in one, two, and many planes, concentric bolt circles, etc. Well illustrated with photographs of tooling and drawing of parts.

For your free copy, write for bulletin T-102, Brown and Sharpe Mfg. Co., Turret Drilling Division, 20 Fitch St., East Norwalk, Conn.

film strip on hammer and screw drivers

A new set of nine film strips, a total of 149 frames, on "Hammers, Screw Drivers, Nails and Screws" covers hammers and screw drivers, and includes important information on the sizes and types of the most commonly used nails and screws to help shop teachers supplement demonstration of such tools. The strips are the fifth in a series produced by the educational department of Stanley Tools.

The strips are 35mm., black and white safety films for wall or screen projection in semidarkened and ordinary lighted room or shop. Each strip in the series is packed individually in a can and the set is packed in a storage box with a manual of suggested questions for testing.

The set of nine strips is offered at $5 per set postpaid by the educational division of Stanley Tools, Division of Stanley Works, 111 Elm St., New Britain, Conn.

on NDEA area vocational education program

An 11-page leaflet "Area Vocational Education Programs," written for special use by state industrial education personnel, has suggestions on how to promote, organize, operate, and appraise area vocational education programs under title VIII of the NDEA which should interest supervisors and teachers in the local districts.

As an attempt to define the controversial "training programs for highly skilled technicians in recognized occupations," this leaflet lists the criteria for approval of area vocational education programs which would fall under this phase of NDEA provisions. In addition, the leaflet specifies the characteristics of training programs for these technicians to help determine preparatory courses "at the high school or post high school level."

Acknowledging that "such skilled trades are encompassing more and more complex operations with the technological progress of industry," this leaflet considers the current interpretation of NDEA efforts to help school training in line with this progress.

For information on "Area Vocational Education Programs OE-80002," write the Division of Vocational Education, Office of Education, Department of Health, Education, and Welfare, Waskington 25, D. C.

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V-E PROGRESS REPORT

(Concluded from page 19)

to permit using area funds for comprehensive programs of vocational education.

Blockage of a proviso the Senate Appropriations Committee attached to the 1960 Health, Education, and Welfare Department's appropriations bill in order to nullify the restrictive language (Bush Amendment) in Title VIII convinced the members of this co-operating group that to cope satisfactorily with the dilemma an amendment to the basic law is necessary.

After the proviso had been eliminated on the senate floor on a point of order (legislating in an appropriations bill) raised by Senator Prescott Bush (R., Conn.), the Senator whose amendment had resulted in the inclusion of the restrictive language in the first place, the co-operating committee decided to visit Senator Bush in person to find out why he offered his amendment in 1958 and raised the point of order in 1959.

In conversation with them the legislator disclosed that his restrictive amendment to Title VIII as well as his recent point of order were offered at the request of officials of the U. S. Office of Education.

Such maneuvering by federal officials, in the opinion of the American Vocational Association's Executive Secretary, Dr. M. D. Mobley, and some other leading educators, is a clear violation of the National Defense Education Act itself which states (Section 102): "Nothing contained in this Act shall be construed to authorize any department, agency, officer, or employee of the United States to exercise any direction, supervision, or control over the curriculum, program of instruction, administration, or personnel of any educational institution or school system."

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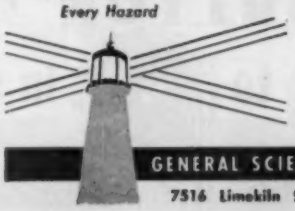

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personal / news

Deaths . . .

● **Professor Emanuel E. Ericson,** Santa Barbara, Calif., educator, died on October 28, 1959, at Glendale.

Mr. Ericson was born in Sweden, and came to America at the age of 18. He studied English, then turned to woodworking, at the same time continuing his education at the Willmar Seminary in Minnesota. Teaching manual training at the Willmar High School was the beginning of his long career in the educational field. He received a two-year diploma from Stout Institute, Menomonie, Wis. Sometime later he returned to Stout for his B.S. degree and later earned an M.A. degree from the University of Southern California. His formal education also included work at Bradley Polytechnic Institute, the University of Chicago, and the University of California.

Professor Emanuel E. Ericson

Professor Ericson was appointed supervisor of arts and industrial arts at Okmulgee, Okla., where he remained for two years.

In 1925 he was appointed head of the industrial-education department at Santa Barbara State College, a position which he held until 1948. He inaugurated the extension division under the State College and became its first director. When the college became part of the University of California in 1944 he continued as extension representative, becoming assistant director in charge of the central coastal area. He retired in 1956 after 31 years of continuous service.

In 1952 he was named the recipient of the "Ship's Citation," a national award for outstanding service and leadership in the field of industrial arts.

His writings include more than 150 professional articles and 14 books, including "Teaching the Industrial Arts," which has been adopted as a text in 139 colleges.

● **Professor Clyde H. Wilson,** Knoxville, Tenn., died suddenly on November 2, 1959, at the age of 69.

He became head of the Department of Industrial Education at the University of Tennessee in 1927, and would have reached the compulsory retirement age on December 28, but was planning to finish out the school year, as is allowed, before leaving the post.

He was a native of Bellbrook, Ohio, and received his A.B. degree at Miami University in 1910; the B.S. degree in education at Ohio State Teachers College in 1912; and the M. S. degree in education at UT in 1927.

During his professional life, Professor Wilson taught manual training at Eastern Kentucky State Normal School; was professor of industrial arts at West Tennessee Teachers College, Memphis; and was professor and head of the department there from 1919 to 1925. He came to UT as associate professor of industrial education in 1925. Also during this time he was director of apprentice training for the National Association of Marble Dealers, 1925–29; civilian instructor for the U. S. Army at Camp Forrest, 1941; and certified instructor trainer for the War Manpower Commission, 1942–45.

Appointments . . .

● **Claudius Wilken,** former general metal shop teacher at Monroe, Minn., High School, was recently appointed supervisor of industrial arts for the St. Paul public school system replacing Benjamin Brynildsen, who retired after 32 years with the system — 18 as supervisor.

A native of Minnesota, Mr. Wilken was graduated from the Alexandria High School and holds a bachelor of science degree from St. Cloud Teachers College. He received his master's degree with a major in industrial arts from the University of Minnesota.

● **Donald G. Lux,** associate professor of industrial education, University of Illinois, Urbana, has been appointed assistant dean, College of Education, University of Illinois, for 1959–60.

Dr. Lux was appointed to replace Assistant Dean Gilbert Finlay who is on leave of absence working on the revision of high school physics instructional materials with the MIT Physical Science Study Committee.

● **Leroy J. Sanders,** B.S., M.S., of Rapid City, S. Dak., has joined the staff at Northern State Teachers College, Aberdeen, S. Dak., as a full-time drafting instructor, and part-time assignments in crafts, electricity, and power and transportation.

Degrees and Awards . . .

● **Dr. Robert C. Kintner,** acting director of chemical engineering, and **Dr. Lien N. Tao,** associate professor in mechanics, Illinois Institute of Technology, Chicago, have been awarded grants for basic research totaling $8,500.

Dr. Kintner's research is entitled "Velocity of Fall of Streams and Clouds of Drops through Liquids in Finite Containers"; and Dr. Tao's grant is for research on "Fluid Flow Between Porous Rollers."

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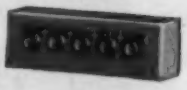

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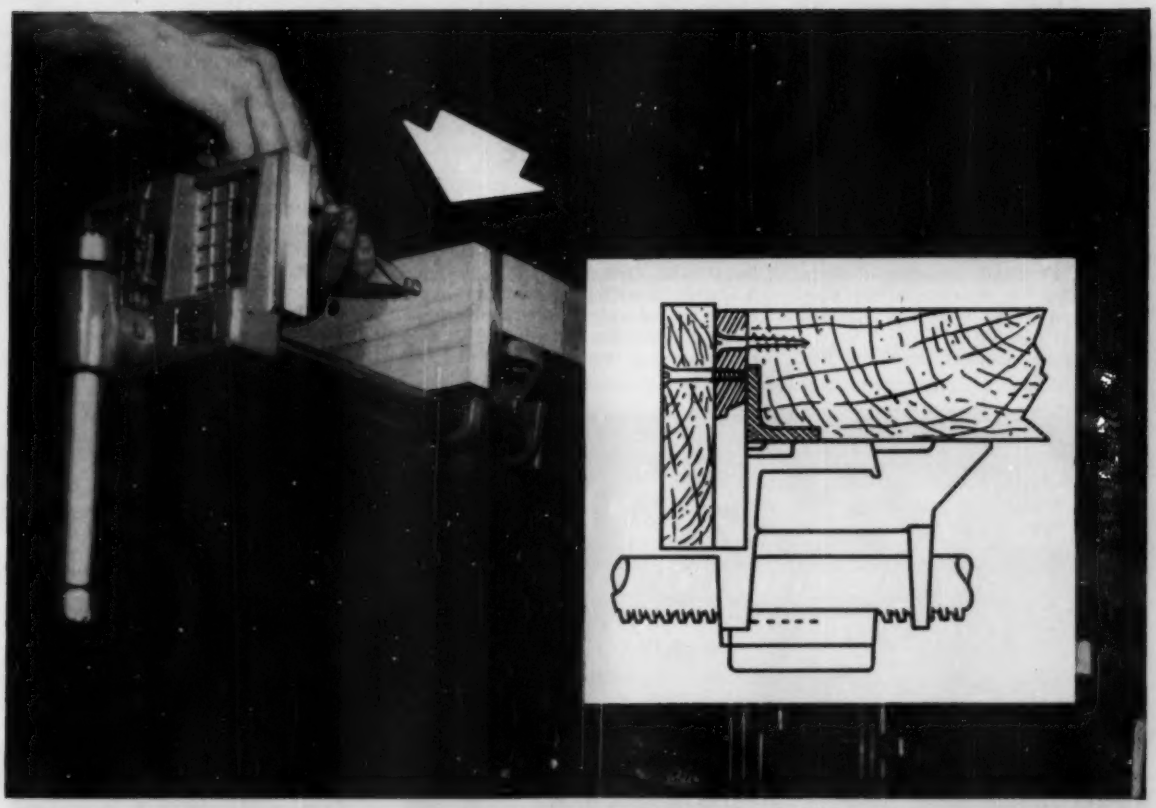

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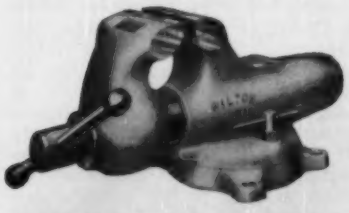

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INDUSTRIAL ARTS CONFERENCE

The 46th annual meeting of the Industrial Arts Conference was held in Chicago on November 12–14. Dr. Verne C. Fryklund, president of Stout State College, is chairman of the Conference and served as general chairman of the first meeting.

Conference members heard the first presentation, "Mathematics and Science Requirements for the First Degree in Industrial Education," presented by Dr. C. H. Groneman and Dr. John A. Jarvis. Their report, based on a survey of 52 colleges, revealed that a total of 34 mathematics courses and 28 science courses is required by one or more colleges. The average of semester hours of credit required in mathematics, the report indicated, is 3.8 with 8.6 semester hours of credit specified in science; algebra is a required course in 13 colleges and physics in 28 colleges. Thirty-five per cent of the colleges surveyed stated that they will be increasing the number of semester hours required in mathematics; 24 per cent said that they were considering a similar increase in science credits.

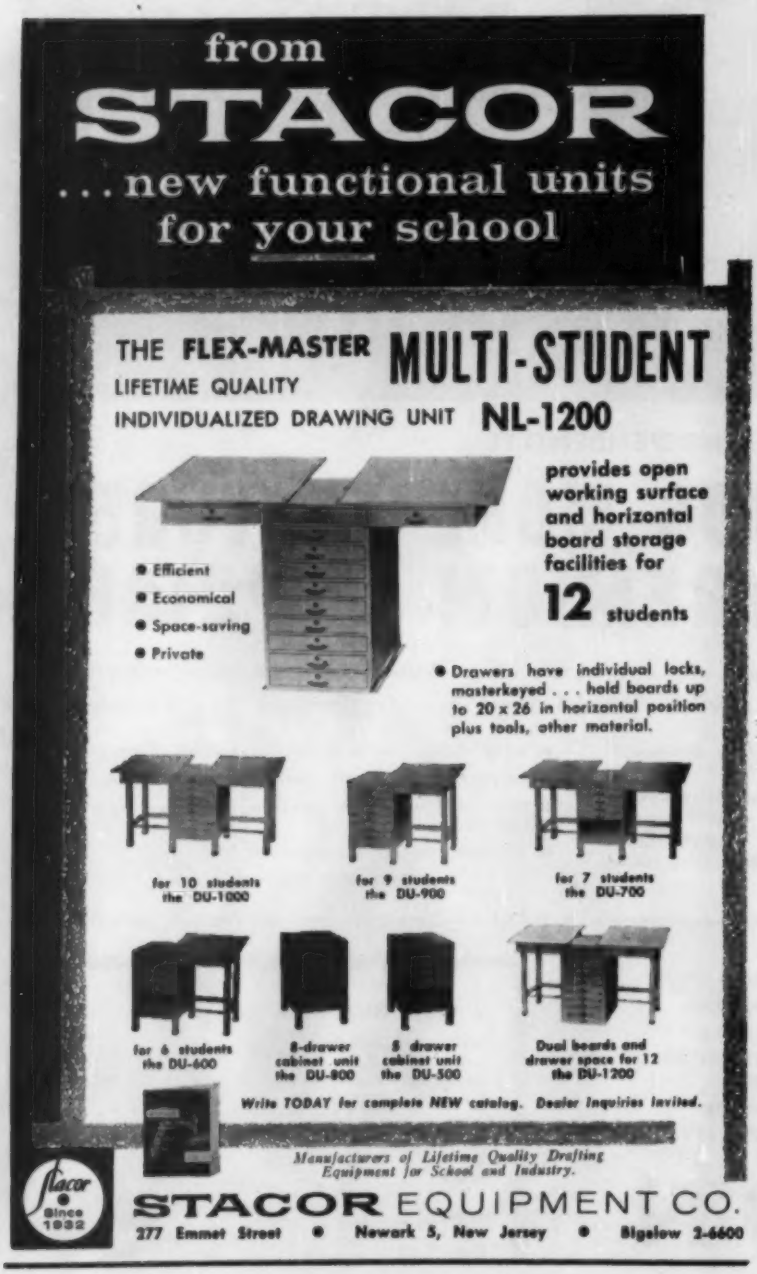
Professor Ralph Wenrich, Dr. Harold Porter, and R. W. Whalin led a discussion relevant to "Findings and Implications of Recent Experimental Researches in Industrial Arts Teaching Methods." Their presentation included a review of five recent studies:

1. "The Effect of the Level of Aspiration Upon Skill Development," completed by Dr. R. E. Lockette.
2. "An Experimental Comparison of Direct and Detailed and Directed Discovery Methods of Teaching Micrometer Principles and Skills," completed by Dr. W. E. Ray.
3. "Order of Presenting Orthographic Projection and Pictorial Representation and Its Effect on Achievement in Engineering Drawing," completed by Dr. E. R. Hepler.
4. "Effect of Emphasizing Time in the Teaching of Engineering Drawing," completed by Dr. M. F. Richards.
5. "An Experimental Study of the Teaching Effectiveness of an Electro-Mechanical Device and Conventional Driver Training Methods," completed by Dr. Louis I. Bernoff.

Professor-emeritus A. B. Mays served as general chairman of the third meeting. At this gathering a committee chaired by Dr. G. H. Silvius, assisted by R. M. Torgerson, reported to the Conference on the "Contribution of Industrial Arts in a Program of Accelerated Scientific Education."

It was generally agreed in that report that if industrial arts courses are to make a maximum contribution to scientific education, there must be a close working relationship between the shop, the drafting rooms, and the other subject fields. Power mechanics, electricity and electronics, drafting, and metalworking make substantial contributions in service to science, evidence reveals

Ed Claude served as general chairman for the fourth meeting, at which Dr. E. R. Glazener, chairman, Dr. Ira H. Johnson, and Nelson Grote led a discussion, "Should Industrial Arts Teacher Education Institutions Attempt to Limit Enrollments to Potential Teachers and to Such Numbers as Can Be Placed, or Should They Serve Pre-Engineering Students, Train Technicians, and Provide Service Courses for Other Departments?" A survey of 51 colleges and universities offering majors in industrial education revealed that 16 of those institutions reported a non-teaching curriculum in industrial technology assigned to the industrial arts department, and that 13 were preparing industrial arts teachers only. Seven of the colleges were responsible for nondegree terminal programs, the study indicated, with 32 industrial arts de-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partments being responsible for the teaching of shop and drawing courses which enroll students from other departments.

L. W. Prakken served as general chairman during the last meeting. Dr. Asbury Smith, Dr. Dempsey Reid, and E. L. Barnhart presented the problem, "How Can Industrial Arts Do an Effective Job of Informing Administration, Guidance Personnel, Teachers, and the General Public of the Learning Gained Through Industrial Arts?" They pointed out that many of our public relation activities tend to reinforce the popular belief that industrial arts is a motor-skill subject which makes little contribution to cognitive and affective areas of learning. This panel suggested that industrial arts teachers and teacher-educators should inform the public of the learnings, other than those related to motor skills and factual knowledge, which are learned in industrial arts courses.

Dr. F. Theodore Paige, Ohio University, Athens; Dr. Lloyd P. Nelson, Ball State Teachers College, Muncie, Indiana; and Dr. Marlowe E. Wegner, Moorhead State College, Moorhead, Minnesota, became members of the Industrial Arts Conference.

— **Dr. John A. Jarvis**
Dean, School of Industrial Education
Stout State College,
Menominee, Wis.

NEW YORK STATE VOCATIONAL AND PRACTICAL ARTS ASSOCIATION

The annual convention of the New York State Vocational and Practical Arts Association will be held April 21 to 23, 1960, in Schenectady, N. Y. Convention headquarters will be the Hotel Van Curler.

Section vice-presidents are as follows:

John G. Miller, New York University — Industrial Arts Education; Richard Z. Kleet, Union Endicott High School — Technical Education; Joseph Divone, Brooklyn High School of Automotive Trades — Vocational Industrial Adult; Michael Aronica, Kingston, N. Y. High School — Vocational Industrial, Boys; Cella McDonald, Trott Vocational High School, Niagara Falls — Vocational Industrial, Girls. — *W. C. Rochelle, Jr., Publicity Chairman.*

NEW JERSEY VOCATIONAL AND ARTS EDUCATION ASSOCIATION

At the annual November New Jersey Educational Convention in Atlantic City, members of the New Jersey Vocational and Arts Education Association heard Dr. M. D. Mobley, executive secretary of the American Vocational Association, discuss "Russia's Economic and Educational Goals and Their Implications for American Civilization."

In his talk, Dr. Mobley compared and evaluated the Soviets' educational aims and organization with ours.

The second half of the sectional meeting at the Hotel Jefferson featured Dr. Albert E. Jochen, New Jersey's assistant commissioner of education in the vocational division, who spoke on "Our Golden Opportunity."

His speech gave an overview of what has taken place during the past year in New Jersey and how the areas of vocational and arts education will expand in the future in New Jersey.

Florence L. D. Heal is president of the association and chairman of the Department of Home Economics at Moorestown.

Leonard Skolnick, instructor of industrial arts at Newark, is first vice-president and also commercial exhibits chairman; Willard Vroom, second vice-president and program chairman; Dr. Burr Coe, third vice-president and educational exhibits chairman; Edmund Boyer, treasurer; Richard Harthmann, secretary; Stanley Grossman, membership chairman; and William Devonald, editor, and Charles Green, assistant editor of the *Newsmagazine.* — *Charles F. Green, Public Relations.*

KENTUCKY I. E. ASSOCIATION

The Kentucky Industrial Education Association held its third annual conference at the Kentucky Hotel, in Louisville, on November 6 and 7. The conference was a professional in-service program for industrial arts, vocational industrial and distributive education teachers throughout the Commonwealth.

Among the features of this year's conference were ten sectional meetings and two general sessions. The first general session convened Friday evening with a welcoming address by James E. Farmer, assistant superintendent of the Jefferson County Schools.

Dr. M. D. Mobley, executive secretary of the American Vocational Association,

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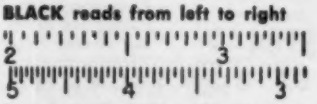

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was the guest speaker for the evening. His topic was "Russia's Economic and Educational Goals and Their Implications for American Civilizations."

The K.I.E.A. banquet was held at noon on Saturday.

Dr. Harper Gatton, executive vice-president and secretary of the Kentucky Chamber of Commerce, was the guest speaker, and addressed the assembly on "Kentucky's Industrial Development."

Newly elected officers for the coming year are:

Thomas E. Myers, president; Paul K. Lynn, vice-president of industrial arts; Steve Marcum, vice-president of trade and industrial education; J. Milward Meador and Howitt Mathis, directors.

The "Ship's Program" closed the conference with a drawing of prizes contributed by the commercial exhibitors. — *Ray Lawrence, Chairman, K.I.E.A. Public Relations Committee.*

CALIFORNIA I. E. ASSOCIATION

The California Industrial Education Convention will be held at the Biltmore Hotel, Los Angeles, on March 11 and 12, 1960.

Dr. Clifford Dobson is president of the association.

B. Gordon Funk, supervisor of industrial arts, Los Angeles City Schools, is general chairman of the convention.

G. Theodore Elmgren is school exhibits committee chairman.

The C.I.E.A. is comprised of approximately 5000 industrial education teachers, supervisors, and administrators throughout the state of California. These educators are representatives from junior high, high schools, junior colleges, and colleges, and have as their major interest such areas as automotive trades, woodworking, drafting, handicrafts, metal-machine, electronics, graphic arts, cosmetology, dental assistants, garment trades, and vocational nursing.

The C.I.E.A. State Convention, held in Los Angeles for the first time in more than 20 years, is the second largest industrial education convention in the United States.

The largest collection of industrial projects ever displayed in Los Angeles will be a feature of this meeting. On display will be work from all areas of industrial arts from the elementary through the state college level; also on display will be projects from vocational education classes.

NATIONAL ELECTRONICS CONFERENCE

John C. Green, director of the Office of Technical Services, U. S. Department of Commerce, spoke before the members at the 15th Annual National Electronics Conference meeting at the Hotel Sherman, Chicago, on the subject "Technical Information — A World-Wide Explosion."

In summarizing the situation of how the Russians are producing abstracts of technical articles from around the world within four to seven months after the material originally appears, which they aim to cut to a time lapse of just three months, Mr. Green suggests the answer to the problem of exploding technical information is the creation of "information" scientists or "information" researchers on the same corporate levels as technical scientists and researchers. These information scientists, Mr. Green explained, would have central responsibility for seeing that all information from all sources promptly reaches the people who could use it.

NORTH CAROLINA I. A. ASSOCIATION

Dr. Marshall L. Schmitt, specialist for industrial arts in the Department of Health, Education and Welfare, U. S. Office of Education, Washington, D. C., was the guest speaker at the fall meeting on Saturday, November 7, 1959, of the North Carolina Industrial Arts Association, in the Grier Junior High School, Gastonia, N. C.

Dr. Schmitt recently visited Russia, and his topic was "Polytechnic Education in the U.S.S.R."

Following the registration, and a buzz session moderated by Dr. Talmage Young, professor of industrial arts, North Carolina State College, luncheon was served in the school cafeteria.

Preceding Dr. Schmitt's address, Dr. W. B. Suggs, superintendent of Gastonia City Schools, welcomed the group, and Paul K. Weatherly, counselor-coordinator, Gastonia Industrial Education Center, gave the invocation.

Jesse R. Dills, of Charlotte, is president of the North Carolina Industrial Arts Association. — *Wilbur C. Bass, Publicity Chairman.*

COMING CONVENTIONS

Feb. 26–27. Industrial Teachers Conference, at Texas A. & M. College, College Station, Tex. Secretary, John Ballard, San Marcos, Tex.

Mar. 11–12. California Industrial Education Association, at Biltmore Hotel, Los Angeles, Calif. President, Dr. Clifford Dobson, 4600 W. Olympic Blvd., Los Angeles 19, Calif.

Mar. 17–19. New Jersey Vocational Arts Association, at Hotel Berkeley-Carteret, Asbury Park, N. J. Secretary, Richard Harthmann, 236 Lexington Ave., Jersey City 4, N. J.

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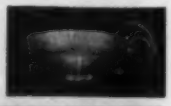

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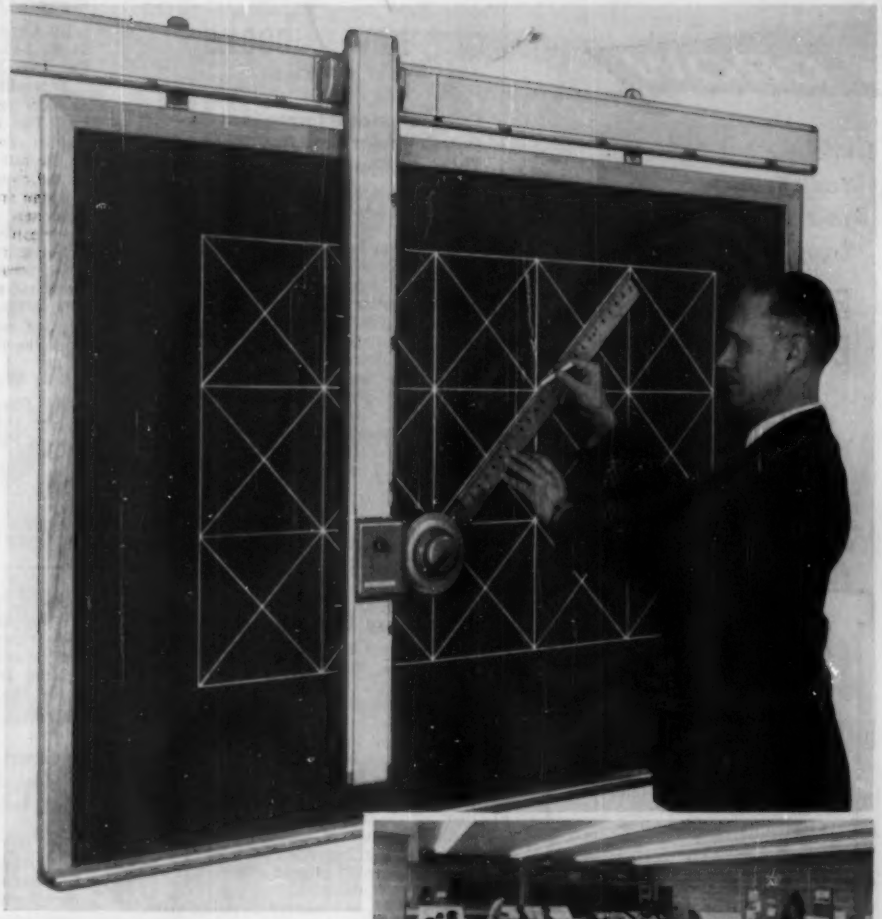

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Occupational Information: Its Development and Application, Third Edition

By Carroll L. Shartle. Cloth, 384 pp., $8.65. Prentice-Hall, Inc., New York 11, N. Y.

The author begins by explaining the uses and need for occupational information, followed by information on occupational values, prestige ratings of industries, and the main divisions of the new International Standard Occupational Classification of Occupations. There is also a chapter on occupational requirements. Other chapters include job analysis, surveys and their uses, and entry fields of work.

This edition features a rearranging of the material from the first and second editions and an addition of information.

General Woodworking

By Chris H. Groneman. Cloth, 248 pp., $4.96. Second edition. McGraw-Hill Book Co., Inc., New York 36, N. Y.

This edition is written as a guide for one or more years of industrial arts woodworking. The book is so arranged that the teacher can select units that are best suited to the rate of learning of the students and to the course itself.

There are sections dealing with hand-tool processes, machine-tool processes, portable electric power-tool processes, finishing, and upholstering. There is reference material on trees, forest products, and occupations in the wood and wood-products industries.

The book is well illustrated, and color is used throughout as a teaching aid in both the illustrations and the text.

Basic Woodwork Projects

By Harry McGinnis and M. J. Ruley. Cloth, 149 pp., $3.20. McKnight & McKnight Publishing Co., Bloomington, Ill.

(Continued on page 60)

on electricity

Elementary Electricity

By William R. Wellman. Cloth, 347 pp., 7 by 9¾ in., illus., $3.96. D. Van Nostrand Co., Inc., Princeton, N. J.

This textbook has been especially prepared to assist in training students in electrical theory on a secondary school level of instruction. While almost all of the material should be adaptable to trade courses, and in fact, should be helpful to any student of electricity, today's emphasis is on technical education, especially in electronics.

The author has attempted to prepare a book that would present a firm foundation in electrical principles.

The book's 18 chapters cover the material under the following titles: first principles of electricity; electric cells; direct current circuits; electrical symbols; electric power; magnetism and electromagnetism; alternating currents; electrical instruments and measurements; inductance; capacitance; inductance, capitance and resistance in a.c. circuits; generators; directucurrent motors; alternating current motors; lighting; communication; rectification of alternating current; and electro-chemistry. There is an index.

Principles of Transistor Circuits

By S. W. Amos. Paper, 167 pp., $3.90. John F. Rider Publisher, Inc., New York 11, N. Y.

Written for the junior engineer and electronic laboratory technician, the book conveys the fundamentals of design of transistorized circuits without wasting words. Although not every type of circuit is covered, those which were chosen are wise selections.

The beginning of the book is devoted to an explanation of semi-conductors, junction diodes, covalent bonds, donor and acceptor impurities, intrinsic and extrinsic germanium, PN and NP junctions; the point contact transistor and junction transistor. An excellent job has been done explaining current amplification factor, voltage gain, power gain, alpha and alpha cutoff frequency. The main portion of the book is devoted to a comprehensive discussion of many types of ampiifier circuits; the transistor superheterodyne receiver; transistorized multivibrators; dc converters; and several other forms of circuitry.

The numerical examples of design problems expand the usefulness of the text to the serious experimenter who has a background in electronics and who wants to probe the operation of these circuits more deeply.

Modern Electronic Components

By G. W. A. Dummer. Cloth, 472 pp., $15. Philosophical Library, New York, N. Y.

In this book the author has sought to present the first comprehensive survey of the characteristics of the more common components, together with information on their behavior under the arduous environmental conditions to which they are now frequently subjected. Chapters on component specifications, transistor-circuit components, reliability, future developments, etc., are also included, and selected bibliographies to many chapters will help the reader to find the more important sources of specialized information.

As an aid to the choice of the most suitable component for a particular purpose, this book should be of fundamental value to the many engineers concerned with the design, development, production, and use of electronic equipments.

Simplified Radio Servicing by Comparison Method

By M. N. Beitman. Paper, 47 pp., $1.50. Supreme Publications.

This manual presents a new way of finding faults in radios and ways of repairing them. Theory is kept at a minimum; required information for actual radio work is included.

The comparison method tells what tests can be made to obtain electrical, visual, and other reactions from radio parts and circuits and how to determine if those indications are what is expected from a circuit that is functioning as it should.

Chapters deal with symbols and abbreviations, practical electrical facts, facts about resistors and condensers, electrolytic condensers, coils used in radios, mechanics of radio, facts on vacuum tubes, facts about transistors, how a radio works, and many others.

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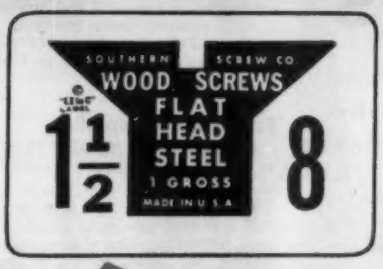

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NEW BOOKS

(Continued from page 58)

This book was prepared for the beginner in woodwork. The projects that are shown have been used in school shops and have been found to fit into the first years of junior high school shopwork. They can also be used in the first course in senior high school and as a guide for the home craftsman.

The purpose of the book is to give basic ideas for simple projects in wood. A picture, working drawing, and alternate designs on some projects are shown. The authors suggest that individuals work out their own design. This presents interest in design and in problem solving.

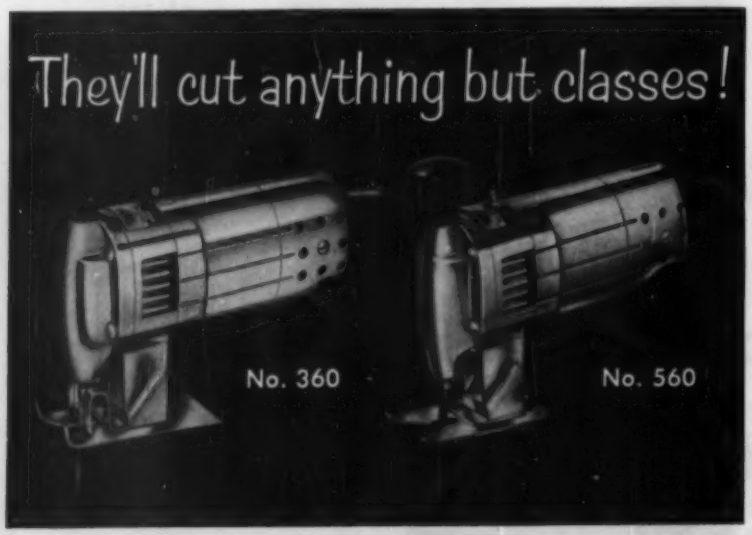
Projects include a toolbox, planter, house marker, coffee-cup rack, spice shelf, serving tray, telephone shelf, footstool, kite reel, modern smoking stand, shadow box, coffee table, wall clocks, and many others.

Woodturning Design and Practice

By Gerald T. James. Cloth, 112., $2.75. Charles T. Branford Co., Newton Centre 59, Mass.

Written for beginners, this book treats the subject of woodturning as an art as well as a craft.

The author devotes his opening chapter to the problem of design and follows it with chapters on practical advice, supplemented with drawings and photographs. The chapters cover the lathe and its accessories, basic operations, turning between centers, faceplate turning, and wood-chuck techniques.



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Metalwork

By G. Keeley. Cloth, 184 pp., $2.50. St. Martin's Press, Inc., New York 17, N. Y.

The purpose of this book is to prepare young craftsmen in metal for taking metalwork examinations. The text is useful also to trade apprentices and others seeking advancement.

The book contains chapters on drawing and on various working processes as well as on theory. Subjects of the chapters include: the manufacture of iron and steel, hand tools, soldering metals, drilling forging, casting, beaten metalwork, and workshop machines.

Machine Shop and Foundry Projects

By Henry J. Kauffman. Cloth, 85 pp., $3.80. McKnight & McKnight Publishing Co., Bloomington, Ill.

This is a collection of contemporary projects for the machine shop. It includes a wide range of useful objects of home and personal use, as well as some additional tools not commonly included in other project books.

Projects are designed to stimulate interest and offer a variety of experiences in working with metals. Preliminary chapters on history of metals, history of machines, and working with aluminum give an insight to metals.

Projects include bottle openers, bracelets and necklaces, candlesticks, punches, ash trays, screw drivers, lazy susans, meat tenderizers, spot lamps, tapered buffing spindles, surface gauges, and pencil holders.

Tool Engineering

By S. E. Rusinoff. Cloth, 326 pp. American Technical Society, Chicago, Ill.

This book was written for the purpose of furthering the training of tool engineers. It defines the responsibilities of the tool engineer which include: (1) planning the processes of production, (2) developing the tools, and (3) integrating the facilities of manufacture.

The author thoroughly covers the analysis and comparison of costs which are necessary in selecting the tools, equipment, and processes best adapted to the product and to the future plans of the manufacturer. He views such areas as tool design, estimating, dimensions and tolerances, and quality control, from the tool engineer's position. Dangerous practices and handicaps which must be overcome are clearly listed.

Practical Electroplating

By Thomas M. Rodgers. Cloth, 333 pp., $8.50. The Macmillan Co., New York 11, N. Y.

From abrasives, acid dipping (pickling), and activated carbon to zinc-base die castings, plating on, zinc plating and zirconium plating, this book covers, in encyclopedic form, the actual practices of plating shops as well as background on the theory of plating. It has been written for the man on the job, for the supervisor responsible for managing an electroplating process, and for the engineer whose training has been in another field.

Included are the formulas for all the basic plating baths, sections on the installation and maintenance of equipment, on salt-water gilding, and on immersion plating. Special emphasis is given to the problems of achieving various decorative colors.

Each type of plating is described in terms of its industrial uses, equipment, solution composition, operation, maintenance, and analytical control of solution.

This book can be used strictly as a reference, as a manual showing the sequential steps in the plating process, or simply as a book which covers the theory of plating.

Automobile Power Accessories

By Harold T. Glenn. Cloth, 240 pp., $7.95. Chilton Company, Philadelphia 39, Pa.

Many advantages, both in safety and in comfort, have resulted from today's use by automobile manufacturers of power accessories, but, at the same time, servicing problems have been multiplied. This book explains in detail how to diagnose the causes of difficulty in operation and sets forth in detail how to service these mechanisms.

Written for vocational-technical students and mechanics, this manual provides expert help and guidance in the understanding of power accessories. The author also covers air suspension, air conditioning, heating systems, temperature-control devices, electrically operated windows, and convertible power tops, with clearly detailed service procedures for cleaning, inspection, installation, and assembly. He adds tips on troubleshooting in each category and provides review questions at the end of each section. Profusely illustrated, the book interprets for the reader every phase of the service procedures of disassembly and adjustment.

Comprehensive General Shop — Vol. I

Edited by Dr. Carlton E. Bauer and Robert L. Thompson. Cloth, 251 pp., $2.94. The Bruce Publishing Company, Milwaukee 1, Wisconsin.

This book is the first of a three-volume series of texts in high school shop designed to meet the needs of industrial arts teachers who are interested in teaching multiple activities in junior high school.

The book is divided into sections on metalworking, woodworking, graphic arts, electricity, ceramics and textiles, leather, and plastics. Each section was prepared by a teacher specialist in that area of instruction.

This volume is designed for pupils just being introduced to industrial arts. It is a complete course of study for the level for which it was designed. It is written around a group of basic projects in each of the areas of comprehensive general shop. There are five suggested projects in each of the six shop areas covered, and each project is well illustrated with photographs and line drawings. Detailed instructions on how to build the project are included.

Building Construction Estimating — Second Edition

By George H. Cooper. Cloth, 398 pp., 6¼ by 9¼ in., illus., $7.50. McGraw-Hill Book Co., Inc., New York, N. Y.

The material in this textbook has been used for many years with success by the author's classes at Mechanics Institute, New York City. In the present edition, other schools should find the book well arranged and useful for their purposes.

This is intended to be a standard textbook for a full course in technical and vocational schools and also for intensive study by properly qualified students in technical institutes and colleges.

The practical requirements of the classroom have been given consideration throughout. The book forms a complete working plan for the instructor and contains all the required material, including two sets of plans, many specimen estimates, hundreds of construction terms, and all essential reference data.

Chapters 1 to 10 discuss contracting as a business, building codes, plans, specifications, contracts, and the general technique of estimating. This material comprises the first half of the course.

Chapters 11 to 18 deal with the estimating of work that is customarily performed by the general contractor's own men.

Chapters 19 to 28 treat of the work usually done by the subcontractors' men.

The final chapter deals with the terminal aspect of the course.

Mahogany in New Fashion Finishes

Paper, 16 pp., 4 by 6 in., 25 cents per copy. Mahogany Association, Inc., Chicago, Ill.

Each page is a color plate, showing an accurate reproduction of one of the recently developed "new look" finishes on one of the popular figure types of Mahogany.

Working with 24 leading wood finish manufacturers, the Mahogany Association developed more than 150 different new finishes for Mahogany more in keeping with current style and design trends. Included are 44 different shades of brown from which the 16 color plates were selected.

Helicopters and Autogyros of the World

By Paul Lambermont and Anthony Pirie. Cloth, 255 pp., 3¾ by 8¾ in., illus., $10. Philosophical Library, Inc., New York, N. Y.

This is an interesting reference book in which the author describes the products of each of 22 nations and gives the technical details of the machines in tabular form.

The book contains 64 pages of halftone illustrations.

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- MODELS
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- PATTERNMAKING AND MOLDING
- PLASTICS
- WOODWORKING
- WROUGHT METAL

The big news from Ford IAA this year is the announcement of an exciting new category in the Models Division for SOLAR ENERGY DEVICES. The sun's energy can be used to cook, purify water and power small motors. Your students' solar energy projects may make a valuable contribution to the development of this new field. But time is running out! Send for the rules booklet and get your student projects started now. *Entries must be received in Salt Lake City by June 10, in Dearborn by June 25, 1960.*

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THE NEW MEAD BANDSANDER

Mead Specialties Company, manufacturers of industrial burring machines, air clamps, and air operated devices, have introduced their new Bandsander (burring machine).

The New Mead Bandsander

The new model Bandsander should find many uses in school shops, and for all kinds of work with wood, metal, and plastics. Compared with earlier models, it is more modern in appearance, being made with highly finished stampings instead of raw castings, with greater accuracy in the adjustment of the tilting table top and belt pulleys.

The over-all height of the Bandsander is 21 in., base 4¼ by 9 in., work table 7 by 8½ in., shipping weight 22 lb., surface speed of belt 1600 ft. per min. Motor recommended, ¼ h.p., 1750 r.p.m. (3-in. V-pulley is furnished for motor, 2-in. pulley for Bandsander).

Further information available by writing for descriptive folder.

(For further details encircle index code 0101)

NEW KNIGHT MODEL KN-3225 TRANSISTORIZED, MOBILE 25-WATT P.A. AMPLIFIER

Allied Radio Corporation announces the availability of their new Knight KN-3225 Transistorized, Mobile 25-Watt P.A. Amplifier. Designed to operate from any 12-volt d.c. source, a full 25 watts of audio power can be had by simply plugging in the power cord of the KN-3225, into the cigarette lighter receptacle in cars, trucks, boats, etc.

The KN-3225 is 3½ in. high, 10¾ in. wide, and 6 in. deep. Carrying weight is about 9 lb. Rated power output is 25 watts. Frequency response is 100 to 10,000 cps, plus/minus 3 db, at rated output. Hum and noise level is 67 db below rated output. The KN-3225 has two inputs — one for microphone, one for phono. Controls

New Knight Amplifier

include Mike Volume, Tone, Master Volume, Trumpet Protector switch, and off-on switch. Output impedances are 4, 8, and 16, ohms.

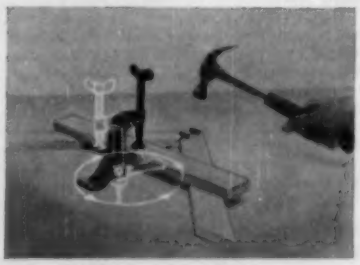
Cabinet styling is black with aluminum panel. The Knight KN-3225 Mobile 25-Watt P.A. Amplifier is listed under stock No. 88 SU 998.

Additional information available.

(For further details encircle index code 0102)

NEW CLAMP ADDED TO "JORGENSON" LINE

Adjustable Clamp Company have introduced a clamp that holds work firmly on any surface, without being limited to positions near the edge.



New Hold-Down Clamp

The clamp attaches to any wood or metal work surface by means of a bolt spotted in the middle or along the edge of the work area. A slot in the base of the clamp engages the protruding head of the holding-bolt so that the clamp slides into work position instantly. When not in use, the clamp may be removed, leaving the work area unobstructed.

This installation feature makes the clamp quickly adaptable in home, metalworking, and woodworking shops for mitering, gluing, routing, sanding, mortising, and many other jobs where speedy, sure holding pressure is needed. Installed along the edge of workbench or table, the clamp doubles as a vise.

For either production setups or quick-change operations on drill press or machine

table, the holding-bolt fits into "T" slots or existing holes to hold work solidly.

Additional information is available from the manufacturer.

(For further details encircle index code 0103)

BLACK & DECKER TRIMMER

A new laminate trimmer, incorporating power and precision features until now unavailable in such tools, has been announced by The Black & Decker Manufacturing Company.

Black & Decker Trimmer

The new trimmer was extensively field-tested before being included in the Black & Decker family of power tools. Its principal advantages include compactness for ease of control, incorporated in a design which permits utilization of ample power for heavy-duty production work.

In operation, the new trimmer can be set for high-precision requirements with adjustment controls so fool-proof as to make spoiling work almost impossible, a valuable asset in working on high-priced laminates.

The new trimmer is designed to operate either on direct or alternating current of 25, 40, 50, or 60 cycles and is available for either 115 or 220 volts. Models for 125 or 240 volts can be specially ordered.

Further information may be obtained by writing for it.

(For further details encircle index code 0104)

NEW NONFLAMMABLE WATERPROOF ADHESIVE

The Borden Chemical Company have announced their new nonflammable waterproof adhesive for bonding rubber and vinyl tile to on-grade concrete, linoleum to steel, terrazzo, ceramic tile, and other nonporous surfaces. This adhesive material, called "Cure-Set," is recommended also for bonding metal stair nosings, trim, trackless carpet strips, and other floor accessories.

Tiles may be set within 10 minutes after spreading the adhesive with a notched steel trowel. The product is a two-component system for cold applications. It has a working life of about 30 minutes and a full setting time of 24 hours.

Available in both liquid paste and powder form in one gallon sizes, "Cure-Set" is ready to use and features long storage life.

Further information available.

(For further details encircle index code 0105)

BESELER "PHOTOGRAPHY FOR AMERICAN YOUTH" CAMPAIGN

Charles Beseler Company announces the opening of their "Photography for American Youth" Campaign that provides a Primo Jr. automatic twin lens reflex camera free of charge for purchasers of the Beseler Topcon to present to teen-agers of their choice. The free camera is given when the Beseler Topcon is purchased at its regular price.

Primo Jr. Twin Lens Camera

The Primo Jr. is a versatile precision camera that makes it easy for the hobbyist to take fine pictures in all types of situa-

(Continued on next page)

ON THE SPOT REPORT

DeKalb, Ill., Drafting classes at Northern Illinois U. study with Universal Desk-Topper Drafting Machines. Leslie A. Holmes, President; Z. H. Dorland, Dir. Division of Bus. Services; Otho Quick, Dept. Head; George W. Sonteney, Instr. Installed by Eugene Dietzgen Co., Chicago.

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CMC Aluminum Craft Circles are of the finest quality obtainable.

CMC Safe-T-Etch is the safer, faster etching compound which removes all of the objectionable features in acid etching.

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SHOP EQUIPMENT NEWS

(Continued from previous page)

tions, right from the start. It includes several advanced and exclusive features.

The Primo Jr. is equipped with matched, highly corrected fast f 2.8 Topcor lenses, and makes 12 pictures on 127 film. Its twin lens reflex focuses down to 2 ft., without supplementary lens. It features instantaneous crank winding and automatic film counter. It has an LVS coupled shutter and diaphragm that operate with convenient thumb levers on side of lens mount. Speeds are from 1 to 1/500. Shutter is MX "Synched" and has a built-in self timer.

Included with the free camera is a genuine leather carrying case, designed to permit operation of camera without removing it. The free camera and case will be given with every Beseler Topcon purchased before January 15, 1960.

Write for additional information.

(For further details encircle index code 0106)

IMPROVED PERFORMANCE OF "BUZZER" HEAT TREATING OVEN FURNACE

Charles A. Hones, Inc., manufacturers of self-contained "Buzzer" Industrial Gas Furnaces and Burners which operate without blower or other power, announces a number of important engineering changes in the standard Model No. 55 Bench-Type Oven Furnace.

Standard Model No. 55
Bench-Type Oven Furnace

A new cast iron venturi burner with modernized port design, replacing the previous machined steel burner, takes reflected heat better to speed up metal working, and a new hearth mix in a special Hones silicon carbide formula exceeds previous shock limits and provides greater resistance up to 2000 deg. F.

The furnace is now also equipped with an integral easily-lit, reliable pilot for faster, simplified operation, and a new higher powered venturi which entrains more primary air, and provides higher flame temperatures, quicker combustion, and cleaner results.

"Buzzer" Model No. 55 is an unusually quiet operating unit, due to its exclusive maintenance-free venturi burner design, with versatile applications for heat treating low-carbon steel, pre-heating high-speed steels and numerous other metal working functions without the need for an air blower. It is available in six standard size models with stand, and completely packaged automatic temperature controls can be furnished if desired.

Descriptive literature is available on request.

(For further details encircle index code 0107)

BUILDERS HAND LEVEL

Eugene Dietzgen Company have announced their new easy-to-use Hand Level. It is intended for use by the builder, home owner, contour farmer, road grader, and others requiring approximate elevations.

The level vial is completely protected, cross hairs and stadia lines are registered

Builders Hand Level

permanently on object glass; stadia is standard 1:12. Built-in sunshade reduces eye strain. It can also double as a carpenter's level. The bottom edge is straightedge and bubble registers level. Handy spring tension clip secures instrument to pocket or belt, ready for instant use.

(For further details encircle index code 0108)

NEW FM/AM TUNER

Electronic Instrument Company have announced their new FM/AM tuner that combines, on one chassis, the EICO HFT90 High Fidelity FM Tuner with excellent AM tuning facilities.

New FM/AM Tuner

Called the HFT92, this new FM-AM tuner provides monaural FM reception, monaural AM reception, and FM-Multiplex stereo reception. The HFT92 is not a stereo FM-AM tuner since both types of reception cannot be obtained at the same time.

The FM section includes an entirely pre-wired, pre-aligned "front end" housed and shielded in a solid aluminum-zinc casting. This "front end" is characterized by remarkable sensitivity, complete stability, low noise, and drift-free performance. No AFC is used in the HFT92 because none is needed. All IF coils in both the FM and AM sections are supplied pre-aligned, eliminating any need for alignment instruments in building this tuner from the kit. The pre-wired, pre-aligned front end

plus the pre-aligned IF coils make it entirely practical, even for a novice, to build an FM/AM tuner equal to quality, factory-wired units.

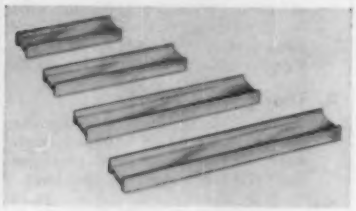
Further information on additional features of the new FM/AM Tuner is available.

(For further details encircle index code 0109)

CHALLENGE ANNOUNCES NEW METAL FURNITURE

A new metal furniture called "Trulite" that offers accuracy, lightness, at a relatively low cost, has been announced by The Challenge Machinery Company.

This new furniture is made of magnesium and is approximately one fourth the weight of cast iron. It is tough and will hold its accuracy under tight lock-up conditions. The new furniture is available in sizes ranging from 2 to 10 ems in width and from 4 up to 70 ems in length.



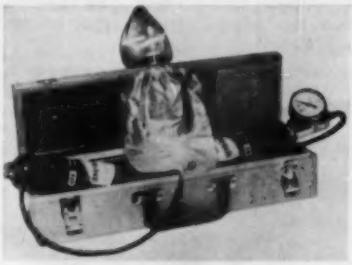
"Trulite" — New Metal Furniture

For more information ask for Release No. 56.

(For further details encircle index code 0110)

PORTABLE EMERGENCY OXYGEN RESUSCITATOR

General Scientific Equipment Company have announced their new low-cost portable Emergency Oxygen Resuscitator that can be attached to any type or size oxygen supply tank without the use of a wrench.



Portable Oxygen Resuscitator

The new portable unit, known as the Oxy-Quik, weighs only two and a half pounds. It includes a face mask, a rebreathing bag to prevent oxygen waste, two oxygen cylinders (one as spare), a medical carrying case, and an automatic pressure-reducing regulator and gauge.

The pressure gauge permits accurate control of oxygen flow at approximately six liters a minute throughout the twelve-minute capacity of the tank. Adaptors are available for refilling or use of the Oxy-Quik emergency unit directly from one, two, or eighteen hour commercial cylinders.

The Oxy-Quik portable Oxygen Inhalator is ideal for supplying emergency oxygen for all conditions requiring immediate oxygen therapy.

Further information available.

(For further details encircle index code 0111)

NEW X-ACTO SAFETY GUARD KNIVES

Specifications and features of Safety Guard Knives, new, versatile hobby and craft tools manufactured by X-acto, Inc., are featured in an illustrated catalog sheet.

Made of heavy-duty aluminum, the new knives introduce an exclusive safety element in a sliding positive-lock safety guard which prevents injury during carrying, handling, and storage. Opened and closed on the chuck principle, the guard covers knife's entire blade or can be locked at any point along the blade length to permit depth gauge cutting. Surgically sharp, the Safety Guard Knife is ideal also for carving, etching, hollowing, scoring, stripping, etc.

The catalog sheet includes data and illustrations of X-acto's line of cutting tools and accessories, aids for carving, shaping, and countless other hobby and craft activities. Tools described include

(Continued on next page)

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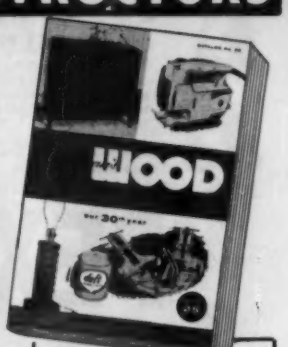

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(For more information from advertisers, use the postcard on page 73)

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SHOP EQUIPMENT NEWS

(Continued from previous page)

knives, saws, routers, punches, gouges, blades, and razor saws.

Copies of the catalog sheet are available by writing.

(For further details encircle index code 0112)

NEW SCREW JACKS AND SAW MANDRELS

Milwaukee Tool and Engineering Company have added five new screw jacks and four new saw mandrels to their growing line of tools.

Load-Holding Milwaukee Screw Jacks

The five new screw jacks are rugged load-holding models, with the largest rated up to 25 tons capacity. Each model is constructed in a special way. The "Bell Bottom" casting is of high tensile gray iron. Swivel top casting is tough malleable iron. Still another quality part is the steel screw, hot-forged and super-strong, accurately machined and threaded.

New Milwaukee No. 1080 Saw Mandrel

Of the four new Saw Mandrels, two are designed for moderate speeds, inter-

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2. **Mathematics for Industry**
   Provides a practical background of math "know-how" for machinist, draftsman, technician, and engineer. Includes hundreds of actual shop problems. **$6.25**
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mittent duty, providing high-tensile gray iron bearing boxes, press-fitted oil-impregnated bearings.

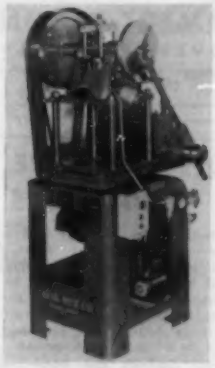
The other two models are built for high speed continuous or intermittent duty. Housing is of high tensile gray iron, with press-fitted ball bearings, sealed and lubricated for life.

Each of the new jacks and mandrels is attractively finished in hammered silver, packed one to a carton.

(For further details encircle index code 0113)

EXPANDED BED PRESSES

Sales Service Mfg. Company have recently introduced a new series of Expanded Bed Havir Presses, which makes it possible to utilize full press tonnage for die trimming.



Expanded Bed Presses

These new presses are now available in 8 ton with 12 by 12-in. bed, 12 ton with 12 by 14-in. bed, and 16 ton with 12 by 14-in. bed. The increased die space provided is said to make it possible in many cases to use a lower tonnage press than is usually required simply to obtain the necessary die space for die trimming operations.

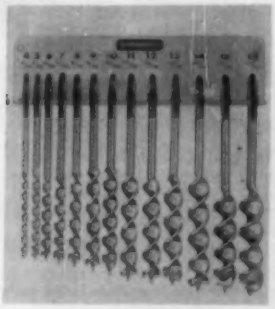
For complete information on the new Expanded Bed Havir Hi-Production Automatic Presses write to Sales Service Mfg. Company.

(For further details encircle index code 0114)

STANLEY'S NEW STEEL RACK WITH AUGER BITS

A new steel rack with auger bits for use on school shop tool boards is available through the distributors. It is manufactured by Stanley Tools, division of The Stanley Works.

The rack holds 13¼ to 1-in. by 16ths,



Auger Bit Rack

which can be easily attached to a wall or tool panel in the school shop. It is marked with bit numbers and fractions in 16ths to assist students in the selection of the proper size as well as helping them to return the bit to its proper place. Racks are furnished with either No. 1013S set of 13 Stanley "Russell Jennings" Extension Lip Bits, double twist, top quality, or with No. H 1213S set of 13 Stanley Solid Center Bits.

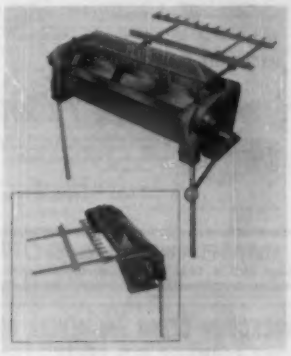
Please write for further information.

(For further details encircle index code 0115)

NEW PEXTO PX-24 BOX AND PAN BRAKE

The Peck, Stow & Wilcox Company announces the New PX-24 Box and Pan

(Continued on next page)



New PX-24 Box and Pan Brake

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Write for Catalog and Cutter Grinding Charts, sent upon request to Instructors.

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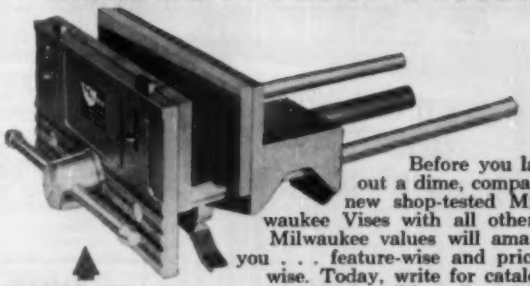

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On each, movable jaw positions in or out without using screw. Built of high tensile grey iron . . . oversized guides and screws, balanced steel handles, many other features.

*Jaw Width

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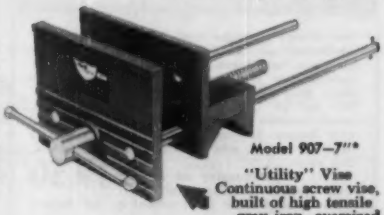

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SHOP EQUIPMENT NEWS

(Continued from previous page)

Brake especially adaptable to school shop use. Small and rugged, it is engineered with many exclusive Pexto features for safe, simple operation. Completely gauged and fully adjustable, the New PX-24 is a multi-purpose machine for precision bending of light sheet metal (up to 16 gauge) with many design features.

Built into the machine is a mechanical advantage that allows the operator to achieve new speed and convenience in performing bending operations. It is the flip-over gauge that gives 0 in. to 24-in. positioning of the sheet without reversing or removing gauge bar. The adjustable apron gives accurate alignment and can be dropped to produce slight radius bends or double hems, or reversed to form narrow reverse bends to ¼ in. The folding bar swings easily on needle bearings. The stop collar is adjustable to any angle, 0 deg. to 135 deg., for accurate duplication of bends.

As a safety feature, the new Pexto PX-24 is designed with an adjustable friction-brake lock that stops upper bar deadweight drop, preventing injuries. It can be locked in position to avoid unauthorized use.

The rigid 1-piece frame is made of a machine tool grade casting, with precision-ground reversible, replaceable bed blade. Fingers are of heat-treated die steel, precision ground.

Full information may be obtained by writing.

(For further details encircle index code 0116)

STARRETT'S NEW DISK TYPE MICROMETER

Designed to measure the thickness of closely spaced sections, a new Disk Type Micrometer introduced by The L. S. Starrett Company can be used where clearances are as limited as .016 in. No. 256 Series Disk Type Micrometers feature thin, tapered anvil and spindle disks, both ½ in. diameter, 1/16 in. thick at the center, and only .015 in. thick at the outer edges.

This new Starrett Disk Type Micrometer is available in 0 to 1-in. size with graduations in thousandths of an inch. It can be furnished with or without lock nut or ratched stop. It is full finished in no-glare, rust-resisting Satin Chrome Finish with rigid one-piece frame of drop forged steel. Other features include: balanced design for easy handling, perfect feel; large diameter thimble with quick-reading figures (every thousandth numbered); one-piece

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(For further details encircle index code 0117)

Descriptive Material...

SAMS PUBLICATIONS ANNOUNCED

Television Tube Location Guide, Vol. 9. Catalog number TGL-9, 96 pp., 5½ by 8½ in., $1.25.

This new Volume 9 contains tube location charts and other Photofact data that helps the technician quickly locate suspected tubes and fuses in hundreds of 1958–1959 model TV's. Guides are completely indexed and comb bound for easy reference.

Thousands of service technicians find these guides valuable. Other guides in this series (covering TV models produced previously) sell for $2 per volume.

How to Save Time Analyzing and Tracing TV Circuits, by Milton S. Kiver. Catalog number is JA-2, 152 pp., 8½ by 11 in., $3.50.

This book presents clear-cut, practical suggestions and short cuts that show how to trace circuits in less time. Every section of the TV receiver is considered in detail from the d.c. power supply to the front-end RF tuner. A special chapter is devoted to printed circuits, the forms they take, and how they should be dealt with for quickest results. Special servicing techniques are presented which enable the technician to uncover defective components in printed circuits without needless soldering and unsoldering of parts.

The book is well illustrated with schematics, photos, and diagrams.

Record Changer Manual, Vol. 12, catalog number RC-12, 160 pp., 8½ by 11 in., $2.95.

This newest addition to the Sams record changer service series brings complete bound Photofact coverage for 62 models of 1958–59 changers.

As with previous volumes in this series, the data presented includes the Photofact Exploded Views, operational data, photographs, assembly and disassembly instructions, parts list, plus detailed service instructions originated by the Sams engineering department. The result is complete and uniform coverage of each mechanical unit.

The material in this volume, along with the information contained in previous Sams changer manuals, make it possible for the service technician or hi-fi enthusiast to maintain a complete, up-to-date library on all types of record changers. The index in Volume 12 covers all previously published Sams record changer data.

Tape Recorder Manual, Vol. 5. Catalog number TR-5, 160 pp., 8½ by 11 in., $2.95.

This manual with photofact service data coverage of 1958–59 popular brand tape recorders, is a "must" for any shop servicing tape recorders. It includes detailed alignment information, parts list, schematics, photo views, operational data, lubrication information, plus the famous Photofact "Exploded View" drawings that show assembly and disassembly details clearly. A special section in the manual gives the reader general and practical servicing information concerning tape recorders. It is estimated that these manuals can cut service time by 50 per cent or more on most recorder repairs where more than tube replacement is indicated.

Auto Radio Manual, Vol. 9. Catalog number AR-9, 160 pp., 8½ by 11 in., $2.95.

This publication is a compilation of Photofact folders giving complete service information on 35 models of 1958–59 auto radios.

(Continued on next page)

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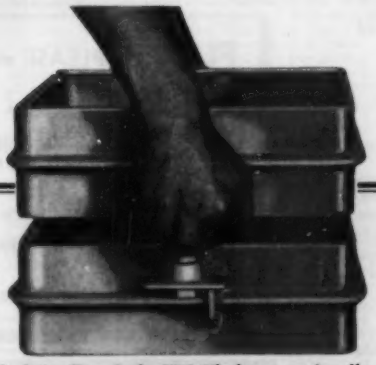

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Descriptive Material...

(Continued from previous page)

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Servicing information on each model includes the Photofact standard notation schematic, alignment information, replacement parts information, photo views of the chassis, plus other Photofact data features. Any service shop will find auto radio servicing more profitable with the addition of this latest manual to their service library.

Sold by electronic parts distributors and bookstores throughout the country, or available from Howard W. Sams & Co., Inc.

(For further details encircle index code 0118)

BORDEN COMPANY CATALOG

A new 36-page two-color product catalog and directory is being offered by Borden Chemical Company. The catalog lists specifications, end-uses, and other technical data for the more than 1000 products manufactured and distributed throughout the world by the company.

Borden Chemical industrial and consumer products are reviewed in the general areas of basic chemicals, monomers, polymers, resins, adhesives, coating materials, plastic products, fine chemicals, organic intermediates, and biochemical reagents.

The new publication also lists the company's sales and service centers, its plant locations, warehouse points, and overseas manufacturing subsidiaries. The directory is cross-indexed by product name and end-use.

Free copy available upon request.

(For further details encircle index code 0119)

NEW SKIL POWER SAW BROCHURE

A new brochure containing information on 16 portable power saws for construction, wood and metalworking, and industrial use has been developed by Skil Corporation.

The two-color brochure lists specifications and features of Skil's five power saw lines including high-torque super duty saws, high-speed super duty saws, high-speed heavy duty saws, chain saws, and the recently introduced two-speed recipro saw.

Copies of the brochure may be obtained by writing.

(For further details encircle index code 0120)

NEW CHALLENGE CATALOG

A new 20-page booklet covering the latest Challenge Paper Drilling Machines and accessories, has been announced by

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When writing for your copy, ask for Publication No. F-875.

(For further details encircle index code 0121)

Personal News from Industry...

BLACK & DECKER APPOINTMENTS

M. Scott Rolston has been appointed Chicago District Manager of the Industrial-Automotive Division, replacing H. L. Bullock, who has resigned his position with the company.

Paul J. Gagliano is appointed Minneapolis district manager, Industrial-Automotive Division, replacing Mr. Rolston.

Ralph W. Janelli, who is Chicago district manager of Black & Decker's Hardware Division, will add the Minneapolis district to his responsibilities, taking over the area previously covered by Mr. Gagliano.

Jay T. Redmon has been appointed Cincinnati District Manager of The Black & Decker Manufacturing Company's Industrial-Automotive Sales Division.

He succeeds Ernest E. Randle, who was recently appointed Sales Manager of the Company's Canadian subsidiary, Black & Decker Mfg. Co., Ltd., of Brockville, Ontario.

(Continued on next page)

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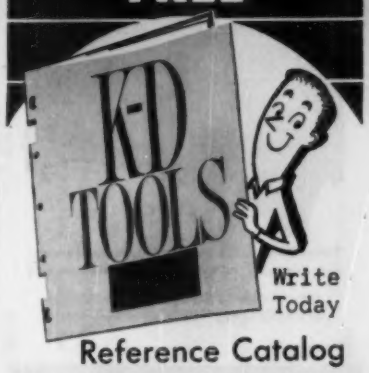

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"Organized Dreaming! . . ." are the two lead words in the title of a fascinating article about designing futuristic models in DUN'S REVIEW, July, 1959. In it are revealed the long term aims that motivate many manufacturers to become product visionaries. The report makes no estimate of the millions of dollars invested annually in "idea" programs. What benefits a company hopes to get out of building and testing futuristic models are disclosed in resumes of the advanced activities conducted by several producers of consumer and capital goods. Although most of the amazing new devices may not be available for years to come, the account nevertheless generates thoughts about how much easier and better life will be in the future as a result of the prototypes dreamed up by industrial designers.

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398 UTICA AVENUE BROOKLYN 3, NEW YORK

PERSONAL NEWS FROM INDUSTRY

(Continued from previous page)

Effective December 1, 1959, Harry K. Shackelford has been appointed Industrial-Automotive Sales Representative. He has been assigned to the San Francisco sales district with headquarters at Fresno, Calif.

Mr. Shackelford replaces Harry Ohlson, who has resigned his position with Black & Decker.

NEW SALES MANAGERS FOR AMF DE WALT

Flemming Andresen has been appointed as a district sales manager with responsibility for sales co-ordination within the area covering northern California and western Nevada, it was announced recently by Conde Hamlin, president of AMF DeWalt.

Leslie L. Durbin has been appointed as a district sales manager with responsibility for sales co-ordination within the area covering the state of Indiana, it was announced.

J. K. ROSE & CO., NAMED AS EICO REPRESENTATIVE

J. K. Rose & Company, Highland Park, Ill., has been appointed sales representative in Illinois and Wisconsin for Electronic Instrument Co., Inc. (EICO) of Long Island City, N. Y.

STANLEY SALES REPRESENTATIVE NAMED

Donald H. Becker has been appointed educational sales representative for the west coast territory by Stanley Tools, division of The Stanley Works, New Britain, Conn.

Mr. Becker was formerly industrial arts teacher at the Junior High School, Corona, Calif.

He was graduated from Wisconsin State College, Platteville, Wis., with a B.S. in industrial arts.

SNAP-ON TOOLS CORPORATION ACQUIRES JUDSON ENGINEERING

The Snap-on Tools Corporation of Kenosha, Wis., has announced the acquisition of the outstanding common stock of Judson Engineering Corporation, Natick, Mass.

Snap-on is a national manufacturer and international distributor of mechanics' hand service tools and automotive testing and service equipment.

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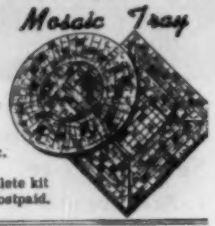

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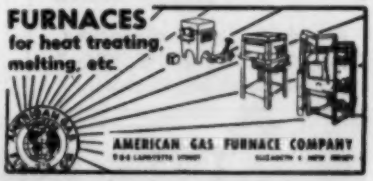

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INDEX TO SHOP EQUIPMENT

The index and digest of advertisements below are provided for your convenience in requesting free product information, catalogs and literature offered by the advertisers and the manufacturers listed in Shop Equipment News. To obtain this information or literature, encircle code numbers, sign the card, and mail. Your request will receive prompt attention.

For your free copy of the educational charts on common hand tools as listed in the "Yours for Better Teaching" department of your IA/VE for this month on page 6, please check the circle YPT-1 on the post card at the right, fill in your name and address and mail. No postage needed.

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